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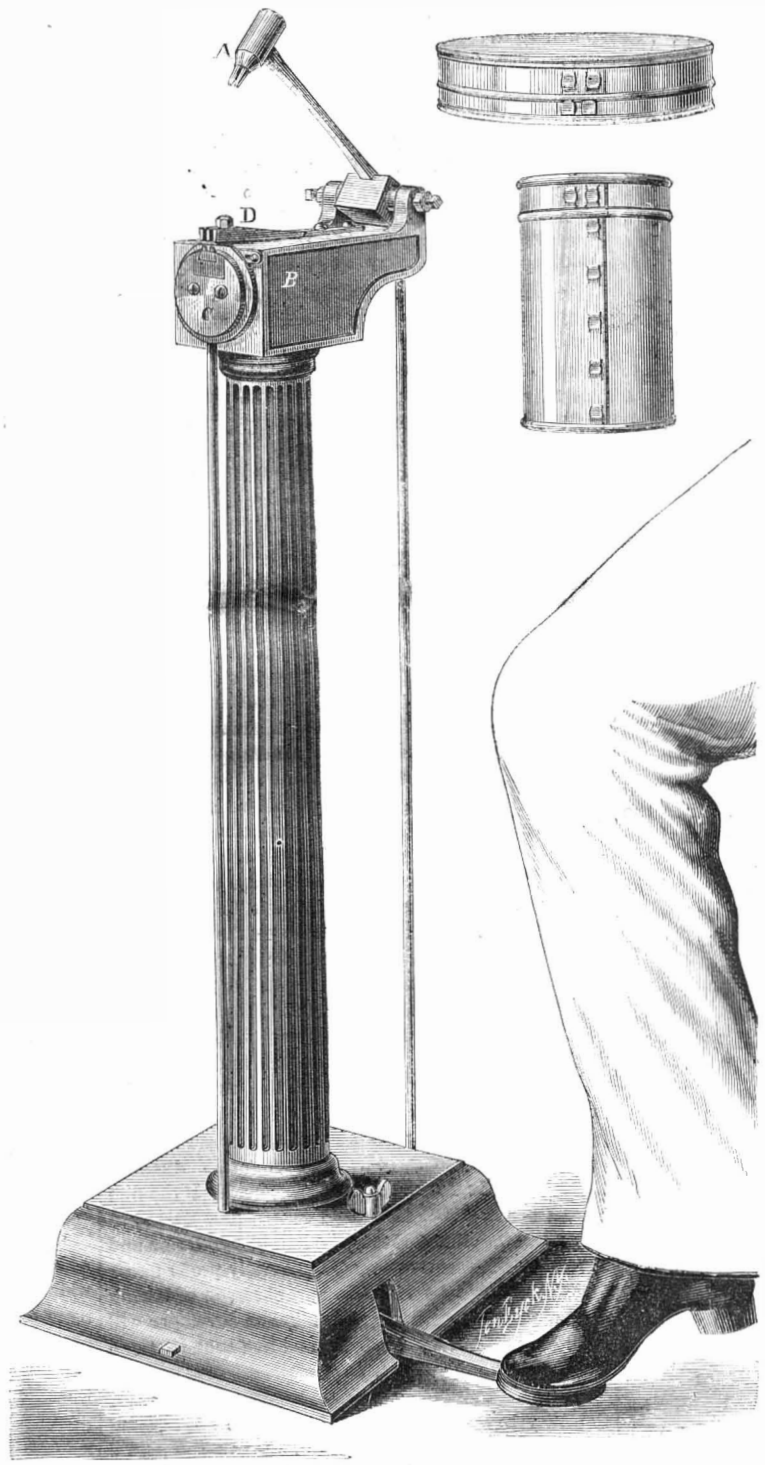
Method for Riveting Blacking Boxes, Etc.

We illustrate, in connection with this article, quite a novelty, which is a very simple but efficient plan for making cans for dry mustard, spices, and coffee, also stovepipes, but particularly for blacking boxes. Any circular tin vessel that does not require to be water tight can be closed up by it. It is intended to supersede soldering, and substitute cheap labor for costly, which it does to perfection, any one being able to use the machine after a little practice.

The machine does the work by riveting, so to speak, though that is not exactly the proper word—one part of the sheet of tin being cut and pushed up through the other, and then slightly upset, so that the sheets are clinched together. In fact, it makes a sort of lockstitch in the lapped edges of the can or box, so that it is strong and durable and cannot be pulled apart except by violence.

In detail the machine consists of a pair of dies, one in the anvil or bed, B, the other in the arm, A; by the first action of these parts, the tin is cut and forced up and subsequently clinched by the hammer. There is also a disk, C, the exact size of the work to be done. These are the principal parts. The action of them is shown clearly by the engraving; the operator places his foot on the treadle and bears down upon it forcing down the cutter, at the same time lifting the hammer, which falls on removing the foot and rivets the seam at once, as shown in the samples at the head of the engraving. The same device can be applied to riveting hoops for buckets, stovepipes, and similar work—machines for this work are now being made.

The work done by this machine is highly approved of by many of the largest manufacturers in the country who are now using them. The machine and samples can be seen at this office. For further information address W. Painter & Co., 45 Holliday street, Baltimore, Md., by whom it was patented on Sept. 5, 1865. [See advertisement on another page.]



PAINTER'S METHOD FOR RIVETING BLACKING BOXES, ETC.

Formation of Mineral Veins.

Mr. Faraday and M. Becquerel, Sen., published many years ago some valuable papers, in which they showed that, by submitting proper metallic solutions to the influence of slow currents of electricity, slowly, but surely, well defined mineralogical specimens would be produced, such as gypsum, pyrites, blende, galena, and several metallic oxides.

These researches present a peculiar interest when we consider the formation of the metallic veins or lodes on our planet, the more so that M. Becquerel employed moistened clay to separate the two different fluids in his tubes as a substitute for porous cells in ordinary galvanic batteries, thereby imitating nature in many instances where metallic lodes are found; thus in Cornwall, often a clay slate called kilas is found to accompany or to line the lodes of tin and copper, which no doubt fulfills, as in the experiments of M. Becquerel, the functions which a porous cell does in ordinary batteries.

That electricity must play an important part in the formation of metallic veins or lodes there can be no doubt, if we reflect on the advantage taken by telegraph engineers of the earth as a conducting medium for the return current of electricity, for, as you are aware, there is no necessity to employ more than one wire, since the earth completes the circuit, thus dispensing with the use of a second one, as it brings back the current to the instrument from which it has been emitted.

Further, many practical mining engineers have observed that the veins or lodes of tin and copper run or strike in Cornwall in an easterly and westerly direction, while those of lead, called "cross courses," have a bearing nearly at right angles. I am aware that there are exceptions to this rule, but they are rare. A further proof that natural electricity must play an important part in the formation of veins or lodes, is that the largest deposits are generally found near the junction of two veins. Also that metallic veins are generally mixed with mineral matters differing entirely in composition from the rocks in which they are imbedded; this mixture of minerals bears in Cornwall the name of "gossan;" thus, for copper ores, the mixture is more or less rich in ochre, friable quartz, etc., and this "gossan" plays such an important part in the formation of veins that it is the surest guide that a Cornish miner can have to direct him toward the mineral lode he is seeking for. In the case of copper, this "gossan" is generally above the lode; in tin, generally below, although often stream tin or peroxide of tin is found in the "gossan." Both for lead ores in Cornwall the gang is generally a soft blue or dark clay slate, containing large quantities of alumina and carbonate of lime. In Derbyshire and other parts the gang is generally heavy spar or sulphate of baryta. As to gold, its matrix is quartz, and in North Wales nearly all the veins run in the same direction—viz., from east to west; while the iron veins, especially those which are magnetic, run from north to south, and in some instances exactly in the direction of the magnetic poles.—*Dr. Calvert*

On Deaths by Lightning.

Mr. Bondin, in a note to the Academy of Sciences of Paris says:—

"In the course of the year 1864 the number of persons in France who died from the immediate effect of lightning was 87—of whom 61 were males, 26 females. In 1863 the number was 103. In the period from 1835 to 1864 it was 2,311 for the 86 old departments of France, and adding 120 (or 4 per year for each of the 3 new departments), we get for the present France, for a period of 30 years, a total of 2,431 deaths by lightning. We believe that we have shown, by a great number of facts that the number of persons wounded by lightning is at least four times that of those killed immediately, the only category reported by the government. Hence, it results that from 1835 to 1864 the total number of killed and wounded was 12,000, or a mean of 400 victims per year.

During this period the proportional number of persons killed varied exceedingly from one depart-

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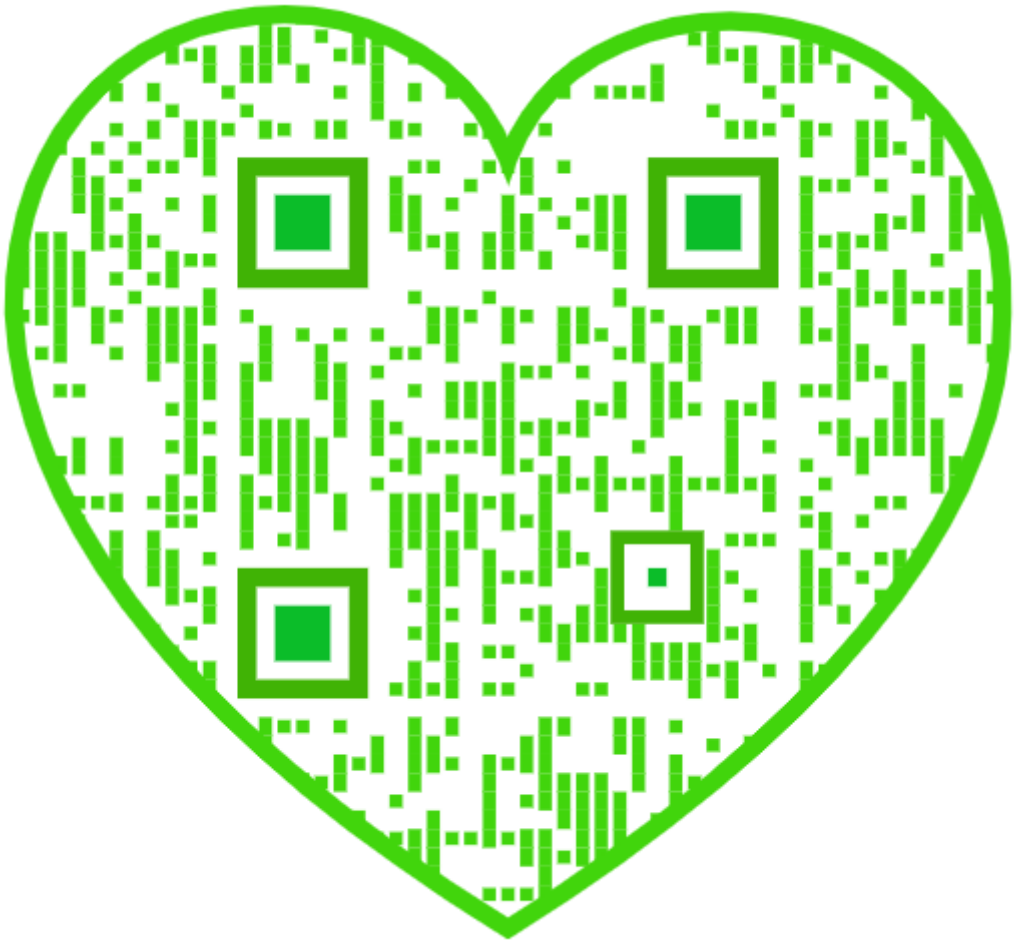

ment to another. The ratio in Lozere was 31 times greater than that in La Manche. In the table which we present showing the distribution of the 87 deaths by lightning in 1864, the most striking result is the very unequal distribution between the two sexes, only 26 females for 61 males. From 1854 to 1864, inclusive, there were recorded 967 persons killed, of which 698 were males and 269 females, from which it would seem that only the small proportion of 28 per cent of those killed by lightning are females. In England, the proportion is only 22 per cent. This comparative immunity cannot be attributed to greater exposure of men out of doors; for it exists even among children less than 15 years old, among whom the ratio of female deaths is only 16·6 per cent, and we may add that, in a great number of cases in which the lightning fell among groups of persons of both sexes, there was a decided immunity shown for the female sex."

ON THE MANIPULATION OF COLLODIO-BROMIDE OF SILVER PLATES.

[From the British Journal of Photography.]

I propose this evening to shortly narrate to you what experience I have had with the use of collodio-bromide of silver in the tannin process. It has been but little, but I shall be gratified if in any way my remarks may assist others in successfully practicing the process; for I believe it to be one capable of yielding results in every respect equal to those by any dry process, and that, too with a much less expenditure of labor, and—what is a better quality—with greater *certainty* of results.

We all know that the peculiarity of it, as compared with the ordinary tannin process, consists in using a collodion containing the sensitive salt or silver in suspension, instead of forming it by means of a nitrate bath. Such a modification has several times been suggested, but I think I am correct in saying that, until the details of Messrs. Sayce and Bolton's experiments were published, no similar process ever came into favor, if even any succeeded.

In the first place, I had better state my method of preparing the collodion. From a stock bottle of a collodion composed of—

Bromide of ammonium	2 grains,
Bromide of cadmium	6 grains,
Alcohol	4 drachms,
Ether	4 drachms,
Pyroxyline	6 grains,

I decant a quantity sufficient for my purpose. For every ounce of this take eleven grains of nitrate of silver; reduce this to a fine powder, and in a non-actinic light add it to the collodion. Afterward shake well at intervals for about an hour or so. If at the end of this time a drop placed on a slip of glass yields a tolerable dense film, sufficient of the silver is probably converted into bromide of silver. Next filter through cotton or thin filtering paper. This is done for the purpose of separating any undissolved fragments of silver or the coarse particles of iodide of silver (for the bromide salts are frequently contaminated with iodides).

It is better that the collodion contain a slight excess of unconverted bromide. An excess of nitrate of silver should not be present, for, if so, it must necessarily be removed by washing or by chemical means; and the absence of such necessity is, I think, one of the greatest advantages of the process.

Now test the collodion. Pour a small quantity in a test tube, and add five or six times its bulk of distilled water; agitate well so as to wash out the salts contained in the collodion. To a portion of this water add a drop or two of the ten-grain solution of bromide of potassium used in developing. If no milkiness occur, in all probability the collodion is right. However, to test it further, and ascertain if there be too much bromide to the other portion, add a drop of a weak solution of nitrate of silver. If there be a very slight milkiness, you may rely on the collodion containing the correct amount; if it, however, be found to contain too much bromide or too much silver, it must be remedied.

As to the keeping qualities of the collodion: I have here two negatives of the same subject. One plate was prepared on the 2d of October last with collodio-bromide mixed a few hours previously, the other predared last week with the remaining portion. Both were exposed a few days ago, one after the other, for a similar time. They readily developed, and there is no difference whatever between the two.

To Prepare the Plates.—Coat the glass with a solution of—

India-rubber	1 grain.
Benzine	1 ounce.
Common resin	½ grain.

[This solution is to remain in a warm place for about twenty-four hours, and then be filtered]: dry before a hot fire. When the plate is quite cool, coat with the collodio-bromide; allow it to set for a short time (not quite so long as for bromized collodion); then immerse in a dish of water, and allow it to remain until all greasiness disappears. Now remove, and place it for a few minutes in another dish of water; take it out, drain for a short time, and place it in the tannin solution. I prefer Mr. Verity's formula:—

Tannin	10 grains.
Gallic acid	5 grains.
Grape sguar	5 grains.
Alcohol	1 drachm
Water	1 ounce.

(To be well filtered). Allow it to remain in this for about four minutes; afterward drain on blotting-paper, or on a few folds of damp cloth, and then dry quickly and evenly. I use a drying box something similar to that suggested by the late Mr. Glover.

When dry, paint the back with anatto or some other orange-colored pigment, as suggested by Major Russell, to prevent blurring. I prepare the anatto by reducing it to a powder, leaving it to soak in a small quantity of water until perfectly soft; afterward mixing it well in a mortar, or by means of a muller, adding a little glycerin to keep it moist. Paint it on by means of a rather stiff brush. If the film be thin, use a good thick coating. I have tried gamboge and other yellow-colored paints, but anatto is by far the best, and I recommend you by no means to dispense with this part of the process; it causes little or no trouble. Enough anatto can be prepared at once to last for a long time, and I am sure no one who has tried it will ever after prepare a dry plate without using it.

Exposure.—I find, as a general rule, that the plates are about twice as sensitive as tannin plates prepared with bromo-iodized collodion and a nitrate bath. On a dull day give a long exposure (for the plates are not much subject to solarization), and use a larger quantity of bromide of potassium in the developer.

To Develope.—First remove the anatto from the back by means of a damp sponge, moisten the film with water, and then pour on a mixture of equal parts of alcohol and water. Allow this to soak well into the film, otherwise I find that small blisters sometimes make their appearance, which is an annoying circumstance, as it renders the after removal of the alkali more difficult. Wash the alcohol off until the water flows smoothly over the film; then mix a solution of carbonate of ammonia, two grains to the ounce. To every ounce of this add about three drops of a solution of bromide of potassium, ten grains to the ounce. Pour this on the plate. Now drop on the developing glass such a quantity of an alcoholic solution of pyrogallic acid as represents one and a-half or two grains; return the ammonia to the glass; then again pour over the plate, and, if properly exposed, the image will quickly appear. As soon as all the details are well out, double the strength of the ammonia and bromide of potassium, adding a little more of the pyrogallic, and pour on and off until a sufficiently dense image is obtained. [See as to this Russell's *Apendix to the Tannin Process*, page 41.] If the film be at all thin, sufficient density cannot be obtained in this manner, but resort must be had to pyrogallic and silver. If such be necessary, I generally prefer fixing first. You need be under no apprehension of having hard pictures by so doing; the alkaline developer will have brought out all the detail and half-tone that can possibly be brought out.

I fix with a strong solution of hyposulphite of soda. Contrary to the experience of others, I do not find this to cause splitting of the film. If you are afraid of such, after the last washing pour over a weak solution of gelatin, which generally will prevent it.

To intensify, use the ordinary pyrogallic solution:—

Pyrogallic acid	1 grain,
Acetic acid	15 minims,
or Citric acid	1 grain,
Water	1 ounce,

adding a drop or two of a twenty-grain solution of nitrate of silver. As a precaution, it is generally advisable to previously pour a weak solution of citric acid over the plate, so as to insure the complete removal of the alkali. The plate rapidly intensifies, more especially if a fair amount of intensity has been obtained by the ammonia developer. Be careful not to allow any portion of the film to become dry prior to intensifying, otherwise it is difficulty to obtain sufficient opacity. If it be desired to obtain extreme intensity, the plates, after being developed with the alkaline developer and fixed, may be treated with a weak solution of hydrochloric acid and bichromate of potash, and afterward reddened by means of Schlippe's salt, as recommended by M. Carey Lea. For transparencies some beautiful tones may be obtained in this way.

Finally: I strongly recommend all dry-plate photographers to give this process a fair trial, and I feel convinced they will be rewarded with success.

EDMUND PHIPPS.

Chinese Workmen.

If we may trust Dr. Rennie, in his new work on "Pekin and the Pekineses," the Chinese workmen are dexterous fellows, and many of their contrivances would afford useful lessons to the outside barbarians. He tells us, for instance, of the scaffolding for covering in the court of the house where he was, that it proceeded rapidly, the uprights being at once erected, and the upper part covered with bamboos about two feet apart. These act as supports for the matting, which is all double, having lining formed of millet stalk. Some of these sheets of mattng are fitted on bamboo frames, which are not intended to be moved, while others are so arranged that by halliards they can be pulled open or shut like window blinds, thus enabling the court to be covered or uncoverd according to temperature, rain, or other circumstances. The skill and ingenuity which the men display is remarkable. They move about on the top of this work, some forty feet from the ground, with the agility of monkeys, and run up and down the straight poles like squirrels, using only their hands and soles of their feet. A leg of mutton on the top of a greasy pole would stand a poor chance of remaining long an object of competition among Pekin scaffold-constructors. The framework is secured only by ropes and twine, and great economy is exercised in picking up and removing the portions that are in excess, several little boys going round in the evening before the men leave, and picking up all the scraps that have been cut off and thrown down. The Chinese workmen display great expertness in throwing materials from one to the other to a considerable hight. The doctor mentioned having seen one of the masons' laborers take a spadeful of mortar, and throw it, spade and all, to a man on the roof of a house, who caught it without dislodging a particle of the mortar. The paper-hangers, also, are very expert in throwing up sheets of paper, with one side covered with paste, ready for being put on the wall. Their paper for room purposes is very good, the "satin pattern" being that most commonly used. Paper of this kind is not kept in rolls, as in the United States, but in squ res about 12 inches by 10 inches. One man stands by a table and applies the paste, and then adroitly throws the sheet up to another, who fixes it on the wall.

A PARIS blacksmith has invented a new system of shoeing horses. Instead of the shoe being placed on the hoof and burning its own resting-place, the outside of the hoof is cut away round the foot to about the depth of half an inch; this leaves a ledge into which the shoe fits, and is then flush with the frog, which just touches the ground, and the whole foot rests on the ground instead of being raised as of old by the shoe. The advantages claimed are that the foot is little pared, that instead of a great heavy shoe the animal is shod in what are little more than racing plates, that the horse never slips, that the shoe allows the foot to expand naturally, and that it lasts as long and is as cheap as the old plan.

IN a mile of the Atlantic cable now being made there are, besides the Manilla which holds the composition, seven miles of copper wire, four miles of gutta-percha, ten miles of galvanized wire, and fifty miles of Manilla spun yarn. That is to say, again excluding the loose Manilla which laps the gutta-percha, in every mile of cable there are seventy-one miles of material.

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RELATING TO GEARS.

Very many obliging readers of the SCIENTIFIC AMERICAN have responded to our request concerning their method of finding the pitch of gears and the best method of stepping off the teeth, whether on the arc or on the chord of the circle. The rules have been published in the SCIENTIFIC AMERICAN at various times, and have attracted much attention from mechanics and others who have occasion to use them.

It is very apparent to the experienced observer that many—may we say *most* of the gears in use?—have been designed with very little reference to the laws which govern their motions—laws which are as fixed and as immutable as the orbits of the planets. We refer in this connection to cut gears. Both kinds have their spheres of action—the cut wheel on light and delicate machinery, and the cast wheel on heavy work; which, in general, from the great size and weight of the parts, preclude the possibility of cutting them except by chipping, which injures instead of benefiting them.

Every wheel that comes from the foundery has a vitreous scale on it, caused by the partial fusion of the sand and facings, which makes it wear well and run easy, and it seems the acme of folly to remove this and expose the softer part below to the abrasion experienced at work.

What is it that makes wheels rattle and jar at work when all the details are firm and solid? And what is it that springs shafting, breaks hangers, forces them out of line, and keeps bearings chronically hot so that all the oil which can be poured on is of no avail? It is teeth grinding one on the other; it is wheels with teeth out of time; it is wheels with teeth of fancy shapes, ill proportioned and entirely defective as regards their essential points. There is but one correct shape for a tooth. Man may scheme and plan as he will, to one shape it comes at the last. Nothing within the whole range of mechanical movements is more beautiful and simple than the transmission of power from one wheel to another by two projections rolling on each other—rolling but never rubbing; each point passing the other with no more than rolling friction, which is the least of all resistances.

That wheels shall so act, depends entirely on the shape of their teeth, supposing, for brevity, that all other mechanical parts are right. If we make teeth pyramidal in form, as they are made in one of the largest and oldest machine shops in this city, they grind and rub for years until they have worn a path for themselves that they can follow with ease. Then tooth and space are alike out of proportion, and with any change of velocity, backlash ensues; one lags until the other catches up to it, and rattle, bang and clash is the order of the day. If we make teeth semicircular at the top and semicircular at the bottom of the space, we take away part of the impelling surface in order to make the wheels mesh properly, and we load the apex or crown of the tooth with a portion of metal which exerts no useful effect but entails waste of material and of power.

The proper form of a tooth is the epicycloidal, or that curve which is generated by one circle rolling on another circle. As this curve is never constant, but changes with every diameter and pitch, all the circumstances or conditions must be taken into account before wheels which will work mathematically correct can be made.

If this well-known fact was rigidly followed out, however, the greatest confusion would ensue, and for every wheel needed, a different set of cutters would have to be made. This would not only be costly but wholly impracticable in the ordinary business of the workshop. A manufacturer who wanted a gear cut without delay, would hardly be disposed to wait until the foreman could go to his factory, look at the size of the driver, count the teeth, make templets and then cutters before his order could be filled. The variation in the shape of a curve, therefore, is so small that it need not be considered in practice, and for wheels of all sizes, such as change wheels for screw cutting engine lathes, a few cutters will answer. commencing, we will say, at those for 50 teeth and running both ways to 12, which is about the lowest gear.

A common way of finding the shape of teeth is to strike the curve from the pitch circle of the next tooth. Not the center of the tooth, *but its side.* This and a subsequent process gives a curve approximating to an epicycloid; not a true one by any means, but a simple and ready way of forming a tooth that will run and wear well, and a method that is within the reach of every one. The curve so struck from the pitch line outward to the crown of the tooth gives the working side, while lines drawn from the pitch line to the center, give the base of the tooth. The result of these will give an angle more or less acute at the pitch line, governed by the size of the wheel, which is of course to be rounded off.

The only correct way to lay off the teeth is on the pitch line, not on the chord of the pitch line. The way to arrive at this is to step off, by an infinite number of small spaces, the pitch on the arc, and then to take the chords found as a constant by which all the other distances may be obtained. It is usual for the pitches of pinions of small diameter, working in large wheels, to be a little greater than the wheels they drive or are driven by.

A true epicycloidal curve may be formed by making segments of wood of the size of the intended wheel, and gluing thin slips on the back of them; something like the flanges which are often made on pinions. The curve of the wooden segment represents the pitch line of the wheel, while the thinner slip projecting beyond it represents the crown of the tooth or outside diameter. Two small steel wires—stout needles will answer—must be pushed through the slips, so that the points come out exactly at the pitch line and at the crown. By placing these segments together and rolling them over each other, as the wheels act when at work, true epicycloids will be formed on the inside of the slips, from which patterns can be taken to shape the teeth by. The points must not project too far through the wood, or they will stick in and not mark. It will be found that the shape thus given is acute at the point of the tooth—too much so for common use, and it must therefore be cut off, but nothing must be added to or taken from the working curve.

It is not at all difficult to make a set of wheels revolve one another. If we take a blank, put it in a milling machine on an arbor, set the index, and start the cutters, a wheel will be produced that will mesh when two are put together, but something more than meshing is needed, and when the teeth are not correctly laid off—or rather shaped—one face will slide on the other face instead of rolling over it.

Beside the shape of the teeth there are other points essential to be considered. These are the width and depth in proportion to the pitch.

The best English practice makes the width of the tooth of spur gears for ordinary work, or where the velocity does not exceed five feet per second—an axial width equal to four times the thickness, and five times the thickness where the velocity exceeds five feet per second. The length is given at five-eighths of the pitch and never to exceed three fourths of the same. Outside of the pitch line the length is four-twelfths, below it five-twelfths; which, in the neat length of the whole, from bottom of space to crown of tooth, equals three-fourths of the pitch.

In an absurd hand-book recently published we are told that the pitch line is the center of the tooth. This work purports also to give directions how to make and cut gears. No set of gears can run properly in that way. The working diameters are at the pitch lines, and the center of motion is also there in properly made wheels; but if the middle of the tooth is the pitch line, the gears will bottom when at work, or else the pitches cannot coincide. This is the way tuns of gearing are made in this country, and it is needless to tell men of common sense that it is wrong. Wheels must have good clearance at the bottom, and have their pitch lines coincident at all times to obtain the best result.

Quantities of cast gears are used on reapers and mowing machines, but they run badly. Sometimes inaccuracies occur through shrinkage, and in others, patterns which were once perfect are destroyed by time and ill usage so that they are no longer reliable. All such should be looked after, condemned if beyond repair, and new sets made on proper principles.

No set of cast gears can run quietly and perform well otherwise, where they are bored out untrue; where they are keyed on so as to be set to one side, even if they are true, or where they are oval through imperfect shrinkage, as before remarked. There is a draft side on every pattern, and cast gears should be meshed so that the draft sides are opposite each other, but in more than one instance we have seen men carefully filing the teeth down "because they were thicker on one side than the other," thereby wasting time and spoiling files.

This article has been drawn out much beyond our average allowance of space, because we have felt the importance of it. Much more might be said with profit, and attention to the principles alluded to will result in a great change for the better in gearing.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

"At a meeting of the Institute of Technology on Thursday evening, an ingenious and useful machine for picking cotton was exhibited. It is worked by horse-power, and with it one man does the work of twenty-five hands. A magneto-electric apparatus for telegraphing short distances of from thirty to sixty miles was also exhibited; the inventor expressing a purpose of soon trying it on longer distances. An interesting discussion took place on the subject of spontaneous combustion, and a case was stated of a box in a mill at Lowell, filled with shavings and sawdust of old bobbins that had been soaked in linseed oil, with some oily rags on top, which was found to be on fire. As an experiment, another box, prepared in a similar way, was placed in a fire-proof place, and the result was combustion in twenty-four hours. The danger of having steam pipes pass through and in contact with wood was shown, instances being related in which the wood by constant heating had assumed the character of charcoal and then taken fire." C. C.

This report is forwarded to us by our attentive correspondent, C. C., and we tender him our thanks for the courtesy. Some of the items invite brief comment.

If any man does invent a machine that will select ripe cotton bolls from green ones, and operate with practical success in picking cotton, we shall regard it as one of the most valuable inventions that has ever been made.

Linseed oil, like the other drying oils, absorbs oxygen from the atmosphere, being converted by the process into resin. The oxygen combines with the oil, generating heat; but ordinarily the heat is generated so slowly that it is dissipated as rapidly as it is produced. When, however, the oil is spread so as to expose a very large surface, as in covering the several fibers of cotton, the absorption of oxygen goes on with greater rapidity; and if the cotton be piled in a heap, or inclosed in a box so as to retain the heat, the heat accumulates till the combustible bursts into flame. Spontaneous combustion, under these conditions has been observed a great many times,

NEW PUBLICATIONS.

A PRACTICAL HAND-BOOK FOR MINERS, METALLURGISTS, AND ASSAYERS.—By Julius Silversmith. Comprising the Most Recent Improvements in the Disintegration, Amalgamation, Smelting, and Parting of the Precious Ores Containing Gold, Silver, Copper, Tin, Quicksilver, etc., etc., with a Complete Digest of the Mining Laws. Published at the Office of the *American Mining Index*, No. 151 Fulton street, New York. D. Van Nostrand, New York, and H. H. Bancroft & Co., San Francisco.

This is a small duodecimo volume of 257 pages, crowded full of the matter mentioned in the title page, and profusely illustrated with wood cuts. The several subjects are treated with intelligence and ability, and the work is of far more value than its cost to all interested in mines and mining operations.

THE BOSTON MACHINIST.—We have received a little manual, called the "Boston Machinist," from John Wiley, publisher, 535 Broadway, New York. The title page says—"Being a complete school for the apprentice as well as the advanced machinist, showing how to make and use every tool in every branch of the business, also a treatise on gear and screw cutting."

THE average speed maintained by the South-Eastern Railway Company's three new vessels—the *Victoria*, *Albert Edward*, and *Alexandra*—during the past half year, has been 17·277 statute miles per hour.

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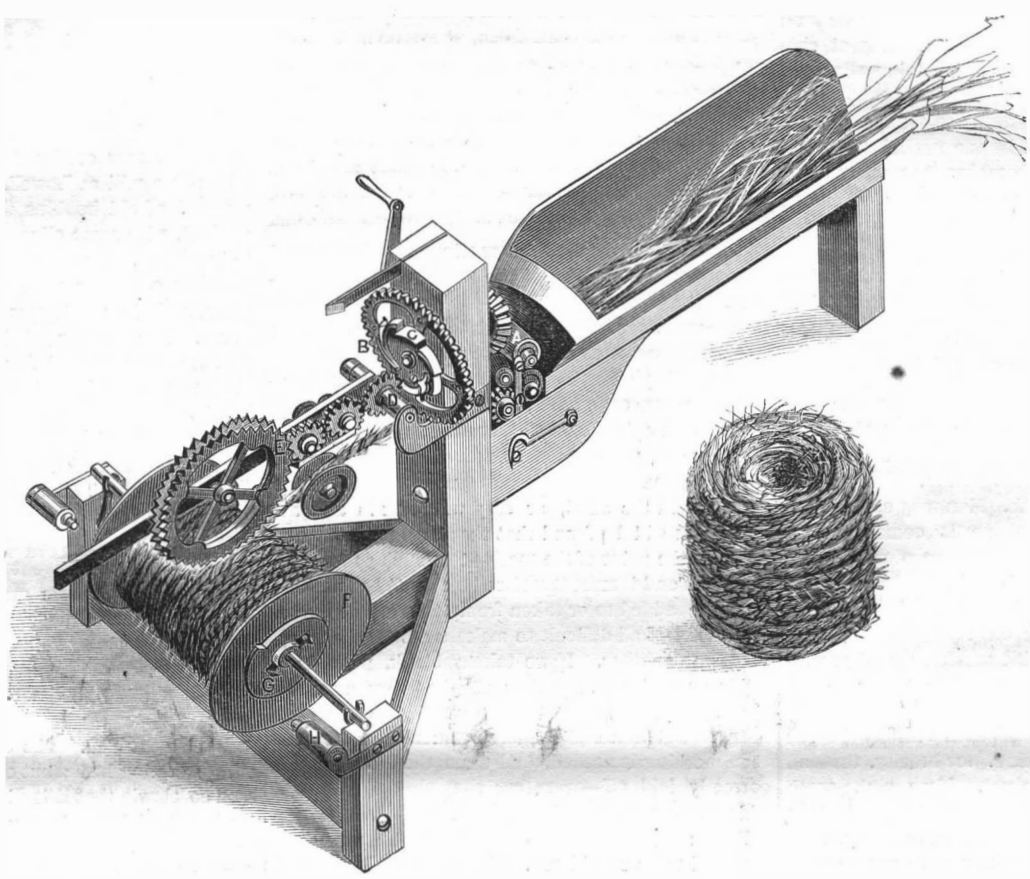
Improved Hay-band Machine.

This machine, although chiefly intended to twist hay or straw bands for foundery use, is also applicable to twisting various kinds of fibers for other uses. It is simple in construction, easily operated by any person of ordinary intelligence and performs its work in a satisfactory manner with unusual dispatch. It is compact and worked in a small space, thus avoiding the troubles commonly experienced in the old way of twisting by hand. It is estimated by parties using it, that, when driven by power and attended by one hand, not less than the work of four men is accomplished by it, and that much more satisfactorily.

Its construction and operation will be readily understood by the following description referring to the engraving:—



PARMELEE'S HAY-BAND MACHINE.

A trough, having a funnel-shaped hole in the end of it, is placed in front of a pair of flexible rollers, A, hinged together at one end of a hollow shaft, which runs in a suitable bearing of the frame work. On the opposite end of this shaft is a pinion which gears into a wheel, B, above it. To the arms of this wheel is secured another with a series of spiral flanges, C, upon the outer edge of its face, so formed as to work into and drive the pinion, D. From this pinion a train of gearing connects to a large wheel, E, with serrated flanges on each side which project and form a groove at the periphery. This wheel rides upon the coil, being wound upon the spool, F, below, causing it to revolve and traverse upon the mandrel, which is set diagonal to the axes of it. The cams, G, on the ends of the spool, by working against a pin, H, at each end of the mandrel, move it alternately in opposite directions, to facilitate the traversing of the spool. The ends of the spool are capable of being detached and, when removed, the body of it collapses sufficient to be easily taken out of the coil. This leaves it in the compact form shown in the isolated figure. The inventor says:—

"The twisting is effected by a planetary action of the rollers longitudinally, the loose fibers in the trough being free to turn in unison with them, while at the same time they are drawn through between them as they are made to revolve upon their axes by the winding of the band upon the spool. Upon the speed of the wheel revolving the spool, relative to the speed of the twisting rollers in their planetary revolutions, depends the tightness of the twist given to the band. This speed is regulated by the number of scrolls upon the disk wheel used, a variety of which are provided to suit different sizes of bands. They can be raised from 3-16ths to one inch diameter, if hay or straw is used, and much smaller if a fiber is used."

The operation of the machine is as follows:—The operator first distributes evenly in the trough a sufficient quantity to make the required sized band, then starts it between the rollers by turning them together with his hand. He then puts the machine in motion, for a few seconds, when the materials in the trough, turning in unison with the rollers, become slightly twisted, which prevents them from drawing apart as they pass through the rollers. The motion of the machine is now suspended and the hands applied to the rollers, as before, until the fibers project through far enough to be grasped. The arm bearing the wheels is raised in a vertical position, and held by a catch; the machine is again started and the band drawn in the direction of the spool until a sufficient length is twisted to make a lap and tie on the body of it. The motion of the machine is suspended, the band adjusted to the spool, and the arm lowered so that the winding wheel rests upon the band upon the spool, and the band placed over the guide rollers, which is to keep it under the winding wheel. It is now ready for continued operation.

These machines are manufactured by the inventor, H. Parmelee, who has a patent pending on it, and is prepared to receive orders. For further particulars address him at No. 1,311 South Fourth street, Philadelphia, Pa.

Broughton' Oil Cup.

We have been shown a letter from the eminent shipbuilders, Messrs. C. & R. Poillon, addressed to Messrs. Broughton & Moore, No. 41 Center street. Speaking to the utility and economy of oil cups and lubricators manufactured by these latter gentlemen, Messrs. Poillon say: "Your transparent oil cups have all the advantages you claim, saving 50 to 75 per cent over the old wick feed cups, besides being certain in their operation. The lubricator is equally good in its operation, economy, and cleanliness." We have procured eleven patents for the ingenious inventor of these, including gage cocks, compression faucets, oilers, etc.—all of which are very superior in their way for economy and utility, and well worth the notice of those interested in such articles.

AMERICAN BREECH-LOADING CANNON IN EUROPE.

Hon. Cassius M. Clay, U. S. Minister at St. Petersburg, has recently taken out patents in Russia, for Broadwell's breech-loading gun, and at Carlsruhe, in Baden, a company has been formed for the manufacture of the arm.

The breech-loading mechanism of this gun is that which has recently been adopted by the Imperial Russian Government, and known as the "Broadwell System," and consists of a steel wedge or breech-block moving horizontally in a mortise made through the breech of the piece at right angles with the bore. This breech-block is operated, with certainty and facility, by means of a partially threaded screw located in the rear side thereof, and which finds its female thread in the gun behind it, and is thus securely locked in position at the moment of fire.

One half turn of this screw is sufficient to loosen the block and permit it to be easily withdrawn to the position for loading the piece.

The gas-proof principle of this invention consists in a peculiarly curved steel ring located in a correspondingly shaped chamber in the bore of the gun immediately in front of the breech-block. When the charge is fired this ring is expanded by the gases and pressed tightly against the walls of its chamber and also against a steel bearing plate let into the face of the breech-block, thus forming a perfectly tight gas check.

The weight of the eight-pounder gun is 1,250 lbs The shell, with bursting charge and all ready for service, weighs 16 lbs., and is similar to the Prussian rifled artillery projectiles, being coated with lead and having four circular projections which, being of the same diameter as the bore at the base of the rifles, are, when the gun is fired, compressed into the grooves and thus receives the required rotary motion. The four annular recesses in the lead coating of these shells were filled with twine covered with pulverized plumbago as a lubricator. This method of preparing projectiles is also the invention of Mr. Broadwell, and has the effect of cleaning the bore every round and, is calculated to dispense with the wiping of the bore even after firing a large number of shots.

An eight-pounder steel gun, made at Carlsruhe, has been subjected to a competitive trial with the Prussian breech loader and the French muzzle loader, before the Swiss Military Committee, and A. Herzog, Chief of Ordnance, who says:—

"The rifled cast-steel eight-pounder field gun constructed at Carlsruhe under the superintendence of Mr. G. A, Buhl, upon the Broadwell breech loading system, was tried in the city of Thun, Switzerland, during the months of October, November and December last, during which over one thousand rounds were fired, with grenades, shrapnell, and case shot, partly in rapid and partly in deliberate firing; during the latter, twenty-seven well-directed shots were delivered each fifteen minutes.

"At no time during all the trials did the slightest difficulty occur in operating the breech-loading mechanism. The gas-ring performed its functions perfectly and no escape of gas could be discovered. The smallest charge used being two pounds with grenades weighing sixteen pounds, and shrapnell of twenty-two pounds.

"The range and accuracy of the piece leaves nothing to be desired.

"In consequence of these excellent results the Swiss Artillery Committee have unanimously decided upon the adoption and immediate introduction of this breech-loading system into the Federal service as heavy field artillery."

We understand that the Austrian Government has just completed a twelve and a twenty-four pounder on Mr. Broadwell's Breech-loading system, with which trials will soon be made at Vienna, and that a series of trials with the Broadwell gun will also soon be commenced by the Artillery Committee at Washington.

PRESERVATION OF FRESCOES BY MEANS OF PARAFFINE.—Vohl coats the picture with a saturated solution of paraffine in benzole, and when the solvent has evaporated, washes the surface with a very soft brush. Paraffine has the advantage over other greasy matters of not becoming colored by time.—*Dingler's Journal and Bulletin de la Societe Chimique, etc.* Feb., 1866. [A simlar solution, we may add, has been used in England for the preservation of photographs. —*Chemical News.*

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Notes and Queries

T. A. H., of Ill.—The singing sound of telegraph wires is produced by the wind, not by the passage of electricity.

Sol, of Mich.—We published some time since elaborate directions for making a sun dial. You can buy one ready made for fifty cents.

J. H. H., of Wis.—The specimen is oxide of iron. Its value will depend on its locality.

K. C., of Mass.—The best thing to remove salt from iron is water—wash the iron well in a running stream. We cannot judge of the practicability of your plan for making small castings of steel.

J. S., of D. C.—A cheap substitute for aniline dyes, if equally good, would be of immeasurable value. Coal gas tar is a mixture of a large number of chemical compounds, each having its peculiar odor with its other peculiar properties. The odor can be removed only by destroying the substance, and as most of the substances are odoriferous, if the odor of all was removed the mixture would cease to be coal tar.

J. R. G., of Ky.—By mixing coal tar thoroughly with potash, soda, or other alkali, you will neutralize any acid that it may contain.

D. L., of Pa.—You can make the very best black ink by boiling 12 pounds of nutgalls in 12 gallons of water three hours, then straining and adding 5 pounds of green sulphate of iron, and 5 pounds of gum senegal, both dissolved in water. Boil slowly and add water to supply that lost by evaporation.

H. B., of Wis.—A body set in motion will continue to move forever in the same direction and with the same velocity unless it encounters some resistance or force to change its motion; this applies to rotary motion. The only forces required to sustain the earth in its orbit are the *vis viva* of the earth and the attraction of the sun.

A. F., of Min.—There is difference of opinion among millers in regard to the best size of burr stones.

J. S. R., of Pa.—For work on optics and optical instruments, write to Henry Carey Baird, of Philadelphia.

H. A. D., of N. Y.—Manganese is now used extensively in the manufacture of steel; and the binoxide in the manufacture of chloride of lime. Its use is rapidly extending and mines of it favorably located must be valuable.

H. B., of Wis.—Precisely what people mean by the term "perpetual motion" we have never been able to ascertain. They certainly do not mean a machine which will run perpetually, as that a simple water wheel will do. Machines may also be driven constantly by heat and by electricity. They cannot mean a machine that will start and run without the application of any force. As nearly as we can get at it, there is a confused notion in the minds of some persons that by means of mechanism they can perform an amount of work more than equivalent to the work expended in performing it, and that is what they mean by the term "perpetual motion." We do not see that the absurdity, or even impossibility, of this idea follows from any principle of nature except the universal conservation of force.

C. W., of Me.—The pressure of water downward per square inch in a tube filled to the depth of ten feet, is the same whether the tube be one inch or ten feet in diameter.

H. W. B., of Mass.—Smith's Linear Perspective and Warren's Manual, both published by John Wiley, of this city, are highly recommended. Some of our artists also speak highly of Minifie's treatise.

G. H., of Mass.—You will find it most economical in the long run to use the best material that you can get for a jacket for your steam pipe. Whether you use pulverized charcoal, felt, or ashes, the main thing is to keep them perfectly dry.

H. C. A., of Ohio.—Steam in a boiler presses upon the upper surface of the water, and the water thus pressed presses on the water below it; the pressure is transmitted through the water, but the steam does not pass through.

S. B., of Iowa.—Sand is used by builders in this part of the country, not only in laying foundations, but also in building the whole wall—it is the general practice to mix it with the proper proportions of lime and water to make a good mortar.

A. M., of Oregon.—A dam five feet high, placed at the foot of rapids falling 100 feet in half a mile, would affect the depth of the water to a short distance only above the dam—not nearly to the top of the rapids.

A. B., of Mass.—Experiments are being made to test the value of soluble glass for protecting building stone subject to decay, but the results are not yet reached.

D. B., of Ill.—We are obliged to you for your second letter on screw cutting, but we have had so many rules and letters on the subject lately that we must decline publishing it.

B. S. Foreman, Chicago.—Our letters to you came back through the dead-letter office. It is no fault of ours if you do not hear from us.

M. P., of Ohio.—You are one of the few men we sometimes meet with, who understand how to differ in opinion from another and still be courteous. We shall be pleased to hear from you at all times on such subjects as are of general interest.

G. W. B., N. Y.—You will find Bourne's Catechism of the Steam Engine a satisfactory work for the information you require.

S. M., of Mo.—If you have satisfactorily determined the cause of all boiler explosions, you can make a great deal of money by preventing them in future. The magnanimity you display toward Mr. William Fairbairn for his errors will no doubt be appreciated by him when he hears of it.

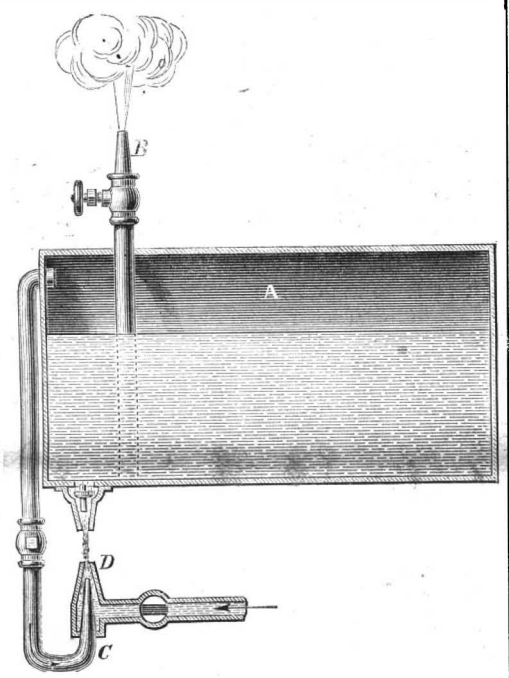
Engineer, N. Y.—We know of no book that treats of Western steamboats. You will find details of their engines in King's Notes on the Steam Engine

Correspondence

The Giffard Injector.

Messrs. Editors:—The accompanying attempted explanation of a seeming paradox may interest a portion of your numerous readers. A converse of the injector may be seen daily in form somewhat as follows :—

Let A represent a steam boiler, having a pressure of say 100 lbs. to the square inch. Let B represent a pipe communicating with the water space and having a ventage of one inch area. On opening B a jet of water will appear which, at the point of emission, will exert a pressure, in excess of the atmosphere, of about 85 lbs., but which, on escaping into the comparatively thin medium outside the boiler, will quickly expand into steam, increasing fully 1,700 fold in bulk, and more than 40 fold in area with a corresponding decrease of inch pressure, to be in a few seconds lost by diffusion in the surrounding air.



The Injector.—Let C represent a steam nozzle, surrounded by a water nozzle, D. The steam, in escaping, becomes condensed by contact with its watery envelope so as to present a result diametrically opposite of the familiar phenomenon alluded to. The force of the escaping jet being concentrated upon a small fraction of its former area, acquires a momentum sufficient to drag forward, by mere friction, a volume of water from the surrounding nozzle and force the united steam into the same boiler from which the steam had issued, or even into another one of much greater pressure.

Seeing that every drop which leaves the boiler returns to it with only such loss of sensible heat as is taken up by the feed water and carried back into the boiler, the object may seem to have been accomplished without expenditure of the motive power, but the seeming paradox disappears when it is considered that, in resolving the steam back into water, there has been paid back, so to speak, the "latent heat" that had been expended in converting water into steam, said heat having been made to take the form of motion in the feed water.

G. H. Knight.

Cincinnati, Feb. 20, 1866.

Seeing Air.

Messrs. Editors:—On page 164, current volume, a correspondent, C. J. S, asks the question, "Why heated air is visible, and cold air invisible?" etc. In your answer, you explain it on the principle of refraction of light from denser to rarer media. Your principles though unquestionably sound, will not explain the phenomena. As for example, if I take a large heated surface, as the roof a house uniformly heated by the sun, and from which heated air of uniform heat and density is rising, and where would be no refraction from differing density; now place a sharply defined object, near the surface, and within its area, and let the eye be placed some distance off, but also within the area, so that between the eye and object the air is of uniform density, yet still the vibratory motion is perceptible. Refraction therefore will not explain it.

But my object is not with your explanation, but to correct an error of your correspondents. You can see cold air as distinctly as heated if you only take the right means. I made the discovery accidentally many years ago, and have tried the experiment a thousand times since, with hardly a failure.

The means I adopted are as follows, and if C. J. S. will try them he will see as I have often done, the air in its cold state:—Take a polished metallic surface of two feet or more with a straight edge. (I used a large hand saw.) Take a windy day, whether hot or cold, clear or cloudy, only let it not rain or the air be murky—in other words let the air be dry and clear; it is better if the wind be steady, but this is not essential. Hold your metallic surface at right angles to the direction of the wind; *E G.* if the wind is north, hold your surface directed east and west, but instead of holding the surface vertical, incline it about 45° to the horizon, so that the wind striking, glances and flows over the edge (keeping it straight) as water over a dam. Now sight carefully over the straight edge at some minute and sharply defined object, and you will see the air flow over as water flows over a dam. Make your observations carefully and you will hardly ever fail to see the air, no matter how cold; the result is even better when the sun is obscured. W. J. W.

Baltimore, March 12, 1866.

Sulphuric Acid in Spring Water.

Messrs. Editors:—I would like to present a few questions for your decision, and to make the matter plain, will give you the facts as they exist. In working a coal mine in this vicinity, the coal is found to contain sulphuret or sulphate of iron; the water from the mines is used for boilers and tweers at a blast furnace, and the result is the boilers last but a few months, and the tweers sometimes are eaten through in two or three days, while at furnaces where good water is used they would last several months. The boilers or tweers do not seem to be destroyed by incrustation.

First, does water coming from coal mines in which there is quite an amount of sulphate of iron, contain sulphuric acid? If not, what is it that destroys the iron, and what effect would it have to mix this water with salt water? Would the water, after being mixed, answer a better purpose for boilers and tweers?

If you can give me the desired information on this subject, you will not only confer a favor on me, but would impart valuable information to many others interested in this subject. J. G. C.

Letonia, Ohio, March 30, 1866.

[The difficulty doubtless comes from sulphuric acid. There is sulphide of iron in the hill, and this, in coming in contact with the atmosphere, absorbs oxygen, and becomes sulphate of iron. The sesqui oxide of iron combines with sulphuric acid in two or three proportions, and in this case one of the higher sulphates is formed, which, in coming in contact with free iron, gives up one or two equivalents of its sulphuric acid to the iron, forming sulphate of iron on the surface of the tweers and boilers. As the sulphate of iron is very soluble in water, it is immediately washed away, thus corroding the iron. Lime would remove the sulphuric acid from the water, but it would form the sulphate of lime—the worst of all substances to produce incrustation. This might not, however, be objectionable for the tweers, though it would for the boilers. Baryta would combine with the sulphuric acid to form sulphate of baryta, an insoluble substance which would fall to the bottom; but baryta is too expensive. We can suggest no remedy but to use other water for the boiler.—Eds.

Pure Silex or Silica.

Messrs. Editors:—We have an abundance of nearly pure silex or silica of the finest quality, for the manufacture of white flint glass or Bohemian. It is near the Tennessee river, which is navigable

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all the year, is in one of the healthiest localities in the world, in the midst of fuel, and in every respect desirable for a glass factory. We also have kaolin, or white chalk, enough to supply the world with porcelain ware for a thousand years; *terra sigillatta* or red clay is abundant, some iron ore 55 per cent; plaster of paris and hydraulic cement material enough to support a very heavy demand, limestone, sandstone, millstone and grindstone, together with extraordinary water power, ever available in the midst of pine clad hills. The soil and climate are very favorable to the growth of grapes, strawberries and peaches. J. M. D. MILLER.

Iuka, Miss., March 6, 1866.

To Sawyers.

MESSRS. EDITORS:—In this section of the country there are a great many circular sawmills, and very few sawyers capable of doing good work in all kinds of hard timber; therefore, if any of your readers are practical sawyers, I would like very much to have them give some information on the following points:—

In regard to the position of the saw, ought its side to stand parallel with the carriage, or should the front be nearer? And if so, how much? What shape should the teeth have? To what angle should they be dressed? How deep from the point of the tooth should the throat be? Is it necessary for the mandrel to have "end play?" and if so, how much should it have? How should the saw stand when the guides are set? All the saws here have guides of some description, and are from forty-eight to sixty inches in diameter.

Some information on the above questions would be useful to many besides myself. F. M. E.

Warrensburg, Mo., Feb. 6, 1866.

Way to Granulate Zinc.

MESSRS. EDITORS:—In your journal of the 10th inst., a correspondent asks how to granulate zinc for brazing. Let him take a common corn broom, wet it thoroughly, and shake out the superfluous moisture. Then pour the molten zinc through it, at the same time shaking it sideways; the fine splints of the broom divide the drops of metal finely, and being moist it does not stick to them, being repelled by the film of steam made by its contact. The broom had better be held over a pan of water, to prevent the running together of particles not congealed in passing through. Brass may be done in the same way for brazing. W. P. C.

Lowell, Mass., March 12, 1866.

The Maximum Strength of Iron.

MESSRS. EDITORS:—I would like to know at what degree, Fah., iron attains its maximum density; for if it continued to contract by lowering the temperature, its cohesive attraction is augmented, and consequently its capacity to sustain a suspended weight, and the parting of supporting rods and tires, etc., at frosty times, must be attributed to the increased tension rather than diminution of strength.

J. F. L.

Logan Co., Ohio March 13, 1866.

[Iron doubtless continues to contract with the diminution of its temperature, but it does not follow that its strength increases with the contraction. —EDS.

To Make Smooth Iron Castings.

MESSRS. EDITORS:—Seeing in your paper of the 17th, an inquiry headed "Query for Molders," I will undertake to answer it. Facing is made by mixing coal and sand together in the following proportions: One of coal to eight or nine of sand. Facing alone does not make smooth castings, except for light ones—such as railing, brackets, etc. If S. V. E. wants to make machinery he had better use facing, and then dust on blacking and soapstone, in proportions of one of soapstone to two of blacking, and then return his pattern or slick it down with a tool, as circumstances may prove best, and leave his castings in the sand over night and they will turn out smooth.

Pittsburgh, Feb. 18, 1866.

Drawing Dust from Shops.

MESSRS. EDITORS.—Would some of your patrons inform me how to construct a vacuum over a machine that makes very much dust, and is injurious to the men working near it? I think a vacuum could be formed to draw all the dust up into the room above. I have been in receipt of your valuable paper for over a year, but have seen nothing touching on that point. INQUIRER.

Brooklyn, N. Y.

[It is the practice in cotton manufactories to draw the dust from out the picker room by means of a spiral fan placed on the outside of the mill, with a box pipe leading from under the picker to the fan. The fan is made with four blades, like a boy's windmill, and is run in a box like a cheese box, which has an annular opening in its outer face at the periphery. —EDS.

The Metrical System---Winding Watches.

MESSRS EDITORS:—In your article, a few weeks since, respecting a change to decimal weights and measures, I think you neglected the principal difficulty.

There are several measures in use, and some in store which the owners do not like to lose. Indeed, if the Government should assume one-half the cost of what would be lost in the change, it would make an appalling addition to "the debt," and for that reason the desirable change must fight its way.

I wish you would tell our watchmakers, to make the hole in the inner case, for winding, about 0·6 or 0·7 of an inch diameter, fitting nicely around or upon a rim, raised upon that part of the frame for that purpose; said rim to form a cup or cavity, in which the key, hinged to the winding post, shall be ready for use by simply raising it with the thumb nail.

E. J. A.

Coos, N. H., March 14, 1866.

[It seems to us that any trader, or even farmer, will save enough labor in calculating in a very short time to compensate him for changing his scales and measures.

The suggestion in regard to watches we submit to watchmakers, who will take it for what it is worth. Our correspondent may not be aware that some watches are now made to wind by simply turning the stem.—EDS.

To Dissolve Shellac.

MESSRS. EDITORS:—When I wrote to you in answer to a correspondent requesting a solvent for shellac, I did not suppose it would elicit so many responses from various parts of the country, and if the correspondent who wrote that he had failed to "secure such results" with borax, had taken the usual course in making all kinds of varnishes, viz., the application of heat, he would have met with success.

We have had up to the present time the following solvents besides alcohol, bicarb. soda, aqua ammonia, borax, and lastly, saleratus, all of which are alkalies. Undoubtedly any alkali will answer equally well. J. F. P.

Cincinnati, March 14, 1866.

Length of Geological Periods.

All the facts of geology tend to indicate an antiquity of which we are beginning to form but a dim idea. Take, for instance, one single formation—our well-known chalk. This consists entirely of shells and fragments of shells deposited at the bottom of an ancient sea far away from any continent. Such a process as this must be very slow; probably we should be much above the mark if we were to assume a rate of deposition of ten inches in a century. Now the chalk is more than 1,000 feet in thickness, and would have required, therefore, more than 120,000 years for its formation. The fossiliferous beds of Great Britain, as a whole, are more than 7,000 feet in thickness, and many which with us measures only a few inches, on the Continent expand into strata of immense depth; while others of great importance elsewhere are wholly wanting with us, for it is evident that during all the different periods in which Great Britain has been dry land, strata have been forming (as is, for example, the case now elsewhere) and not with us. Moreover, we must remember that many of the strata now existing have been formed at the expense of older ones; thus all the flint gravels in the south-east of England have been produced by the destruction of chalk. This again is a very slow process. It has been estimated that a cliff 500 feet high will be worn away at the rate of an inch in a century. This may seem a low rate, but we must bear in mind that along any line of coast there are comparatively few points which are suffering at one time, and that even on these, when a fall of cliff has taken place, the fragments serve as a protection to the coast until they have been gradually removed by the waves. The Wealden Valley is twenty-two miles in breadth, and on these data it has been calculated that the denudation of the Weald must have required more than 150,000,000 of years.—*Lubdock's Pre-Historic Times.*

FOREIGN SUMMARY.

REMARKABLE results have been obtained by M. Schlœsing in the production of exceedingly high temperatures by the combustion of gas with air. By regulating the quantity of hydrogen and air brought together at the time of combustion a considerable range of temperature can be obtained, the highest named in a communication recently made to the Academie des Sciences of Paris, by Sainte-Claire Deville, being 2,736 deg. Cent.

ENGRAVING upon glass has hitherto been, not unfrequently, effected by the use of fluoric acid, which often produced dangerous wounds, when by accident it came in contact with the skin of the workmen. M. Henri Sainte-Claire Deville has recently exhibited to the Academy of Sciences of Paris some very fine examples of glass engraving executed by means of a solution of the fluoride of calcium in hydrochloric acid, with which there is no such danger. The results obtained by this method are said to be exceedingly satisfactory.

THERE are now twenty-three steam packet companies in England who own about 370 steamers, the tunnage of which is 560,000, the horse power 110,000, and the value between £30,000,000 and £40,000,000 sterling. 164 of these ships are connected with Liverpool, 94 with Southampton, 40 with Hull, 35 with London, 16 with Glasgow, and 15 with Hartlepool; 200 of these steamers trade with the Eastern, and 170 with the Western hemisphere. Upward of 80 of the largest of the latter trade exclusively with the United States.

FROM Greece intelligence has arrived that a new island began to rise above the level of the sea in the Bay of Thera (Santorin) on the 4th ult., and in five days it attained the height of from 130 feet, to 150 feet, with a length of upwards of 350 feet, and a breadth of 100 feet. It continues to increase, and consists of a rusty black metallic lava, very heavy, and resembling half-smelted scoria which has boiled up from a furnace. It contains many small whitish semi-transparent particles disseminated through the mass like quartz or felspar.

AMONG other wonders of the forthcoming French Exhibition there is to be a gigantic aquarium, the front of which is alone to measure 100 feeet. Every sort of fish is to be collected therein for the amusement of the public, and even sharks, cod, and porpoises are to exhibit their peculiar habits and customs in grottoes and caves, which are to be excavated in the floor of the building, and filled with sea water.

IT has been stated by Professor Faraday that the total quantity of oxygen daily required for the whole world is 8,000,000,000 lbs., or 7,142,857 tuns.

IT has been ascertained that wax under a pressure of 13,000 lbs. on the square inch requires thirty degrees additional heat to melt it; about one fifth of the whole temperature at which it melts under the pressure of the atmosphere.

THE authorities in Nottingham, Eng., have resolved to construct a subway for the reception of gas and water pipes in a street now forming in the center of the town. This is the third work of the kind now existing in Nottingham.

IMPROVED ROOFING MATERIALS.—We have inquiries from our readers in various parts of the country for these advertisements. Manufacturers are advised to keep permanent advertisements in the SCIENTIFIC AMERICAN, stating price per foot, advantages, etc.

THE eagles which surmount the colors of the French army, formerly made of copper gilt, by galvanism, are now made of aluminium, thus lightening the weight of the flag by nearly $2\frac{3}{4}$ lbs.

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The Composition of Meteoric Stones.

Dr. F. Grace Calvert, in one of his Cantor lectures makes the following statements in regard to the composition of meteoric stones, which are so frequently falling upon this earth from the unknown regoins of space.

Notwithstanding the careful analyses that have been made of these meteoric stones, the presence of no new metal has been discovered in them, or of any which chemists have not found upon our own planet; but they have been able to ascertain that some of these aerolites contain, or are composed in some instances, of metals in a native state, which are never found in that condition upon our planet; thus it has been proved that some of them contain metallic nickel, cobalt, and even iron; in fact, in some instances the volume of some of these aerolites that have fallen on our planet, which are composed of iron, has been sufficient to allow man to work them directly into implements. Such was the case with an aerolite found in Mexico, which had the following compositions:—

Iron, 96·50; nickel, 3·50; total, 100

What in a scientific point of view enhances the value of this peculiar class of meteoric stones is the presence, in some of them, of a peculiar yellow mineral, having a great resemblance to pyrites, but still differing entirely from it in composition, as proved by the analysis of Mr. Lawrence Smyth, who found it to be composed of four equivalents of iron, two equivalents of nickel, and one equivalent of phosphorus, and to it he gave the name of "Schreibersite." It has lately been artificially produced by Mr. Faye, under the able guidance of Henry St. Claire Deville, by melting together in a crucible, a mixture of oxides of iron and nickel, phosphate of soda, silica, and charcoal, allowing the whole to cool, when in the fused-mass were found well defined crystals, having a yellow color, and identical in composition to the "schreibersite" analyzed by Mr. Lawrence Smyth—a triumph of science, for it is the first example of the artificial production of a mineral substance found in an aerolite. The presence of a large proportion of metallic iron, and especially of phosphorus, in this class of aerolites, proves that they must have a cosmical origin, and that they must have been formed, or rather the mass from which they have been detached, must have been produced and existed where there was no atmosphere similar to that which surrounds our planet—viz., one containing oxygen. What tends to confirm this view, is that many of the meteoric stones analyzed by chemists contain a large quantity of carbonaceous matters. The most complete analysis of this class of meteoric stones is that made by Mr. Cloez of one which fell in June, 1864, at Orgueil, in the south of France, and which drew the attention of many scientific men at the time, owing to its fall being clearly traced, and specimens carefully secured; it had the following composition:—

COMPOSITION OF THE ORGUEIL AEROLITE.

Hygrometric water	5·975
Silicic acid	24·475
Sulphuric acid	2·195
Sulphur	4·369
Chlorine	0·073
Phosphorus	traces
Alumina	1·175
Oxide of chromium	0·025
Peroxide of iron	13·324
Protoxide of iron	17·924
Oxide of nickel	2·450
Oxide of cobalt	0·085
Oxide of manganese	1·805
Magnesia	1·163
Lime	2·183
Soda	1·244
Potash	0·307
Ammonia	0·098
Humin	6·027
Combined water	7·345
	96·442

This analysis of Mr. Cloez is not only interesting as showing the numerous substances which enter into the composition of one of these meteoric stones, but especially owing to the fact that he demonstrated in it the presence of an organic substance similar to coal, and also water. Chemists have also ascertained that many meteoric stones are highly siliceous, or composed almost entirely of silica or silicates of various metals. Mr. Charles Sorby, of the Royal Society, has recently published, in the "Proceedings" of that Society, some interesting papers on the microscopic differences which exist between the general texture or appearance presented by meteoric stones and the lava of volcanoes; also between the native meteoric iron and the commercial kind. There can be no doubt that these researches will throw much light on the circumstances that have attended the formation of aerolites in general. At all events, there can be no doubt that fire-balls, falling stars, and meteoric stones, have a cosmical origin, and that they fall on the surface of our planet whenever they come within the earth's attraction, or that this force overpowers that of the sun. It is easy to explain, knowing, as we do, their composition, why they appear luminous when they arrive near the earth's surface, for they have to traverse an oxidizing atmosphere, or one containing oxygen, and as they travel through the space, heat is generated by the friction of the particles composing them with those of the atmosphere, and the heat thus produced becomes sufficient for the combustible matters which enter into their composition, viz., carbon, iron, nickel, etc., being burnt or oxidized by the oxygen of the atmosphere. It is the knowledge of this fact which, no doubt, has suggested to Professor William Thompson his theory, that the high temperature of the sun is due th and maintained by, the heat generated by cosmical matter falling on its surface, as I had the pleasure of explaining to you more fully in my first lecture.

The "Scientific American" on Locomotives.

Our New York cotemporary, the SCIENTIFIC AMERICAN, has been blundering again—nothing very new, our readers will say. Some time since we illustrated, as a matter of curiosity, a remarkable design for a locomotive proposed by M. Thouvenot, a French engineer. We were favored with M. Thouvenot's views, and, these formed the subject of a leading article. The SCIENTIFIC AMERICAN now gravely announces that this very engine is being actually built in England! and calls us to task for stating that the design in question "represented the most advanced practice of the day, and practice which we are rapidly drifting." Yet these statements are substantially true, whatever the SCIENTIFIC AMERICAN may think to the contrary. We are drifting toward the use of excessively heavy engines supported on double bogies; and M. Thouvenot's design is advanced because it departs widely from present English practice. The design, in fact, embodies many points of acknowledged merit; to these we referred, not to its defects. It is to the last degree improbable that precisely such an engine as this in question will ever be constructed in England, and our cotemporary may rest assured that he shall be supplied by us with the earliest possible intimation.—*Engineer.*

[It will be observed that none of the positions advanced by us are refuted.—EDS.

New Things in France.

We select the following from the Paris correspondence of the London *Chemical News:*—

ICE MAKING MACHINE.—Signor Toselli seems to have perfected an ice-making machine for household use, in which compressed steam replaces the ammonia or the sulphurous acid gas employed in the machines with which your readers are already familiar. A small one will make five kilos. of ice an hour at a cost of from three to five centimes the kilo. The plan adopted is shortly as follows:—In one cylinder a solution of common salt is placed, and to this another cylinder is adapted. The saline solution is then heated (not above 100°), and the steam is passed into the second cylinder. After about an hour a tap between the two cylinders is turned, and the one containing the compressed steam is placed in a vessel of cold water.

[This would be 11 pounds per hour at the cost of about half a cent per pound.—EDS. SCI. AM.

OXYGEN CHEAP FROM SULPHURIC ACID.—M. Archereau, I read, has constructed an apparatus for the decomposition of sulphuric acid, according to the plan proposed by Deville, by which oxygen is obtained continuously at a very cheap rate—say a franc per cubic meter. We are promised a description of this apparatus soon. If it be simple and manageable, it will be of great value.

ELECTROPLATING ALUMINIUM AND TIN.—M. Maiche, jr., has succeeded in gilding and silvering aluminium and tin electrotytically so completely that the layer cannot be disturbed by the hardest application of a burnisher.

PRINTING TELEGRAPH.—M. Chevallier Bonelli and M. Hipp have contrived a printing telegraph with one wire, which will print 300 words a minute in Latin letters.

Cavendish Society.

The annual meeting of the Cavendish Society was held in the rooms of the Chemical Society on March 1, Mr. Graham, President, in the chair. The report, read by the Secretary, Dr. Redwood, stated that the Council had agreed to accept a proposal made by Mr. Harrison to undertake the publication of the remaining volumes of Gmelin's "Chemistry" at his own risk, supplying them to the members at one guinea each volume. Two volumes, it is anticipated, will complete the work. A considerable part of Vol. XVII. is in type, and this volume it is expected will be completed in about four months. The Council believe that the public demand for scientific works of a superior character is now so large that there is no longer any field for a publishing society like the Cavendish, and they think the operations of the Society may fitly close with the completion of Gmelin's work.

A Plea for the Ailanthus Silkworm.

SIR:—Having seen a letter in the *Times* relating to the new oak silkworms, *Bombyx Yama-mai*, and their propable acclimatization in England, may I be allowed to say a few words? I have cultivated them for two years with the greatest care, and from my observations fear they will never stand our changeable climate. I reared them successfully, both under glass and in the open air, till the fourth change of skin, when they all died of the malady called "pebrine," induced by a few days of rainy and cold weather in the month of June. The Ailanthus worm, on the contrary, is perfectly hardy, fearing no rain or wind, or even a slight frost. His only enemies are in infancy the ants; in old age, the tom-tits. I rear many thousands every year without the slightest difficulty, and shall be glad to give any persons the benefit of my experience. To show they are gaining much in the public estimation, since I introduced them into England three years ago, I have sold and given away 70,000 eggs annually, besides sending cocoons to all parts of the world; and more than that, I have a gown made from the silk.

DOROTHY NEVILL.

Dangstein, Petersfield, Feb. 24th.

London Times

Patent Office Illustrations for 1864.

We have received from Messrs. E. R. Jewett & Co., of N. Y. a bound volume of illustrations of Patent Office Report for 1864, in advance of its publication by the Office. The work is artistically done and reflects great credit upon the firm. We trust that under no circumstances will Congress consent to inferior work on these reports. They are of great value, if the standard of excellence be kept up.

ANIMAL GRAFTS.—M. Paul Bert informs the French Academy of fresh experiments in grafting the tails of rats upon other rats. He finds that his curious process has succeeded after tails have been removed from the animals to which they belonged, and placed under the following conditions: 1. Exposed to the action of air in a closed tube for seventy-two hours, at a temperature of 44° to 46° Fah. 2. After exposure to a humid heat of 135° Fah. 3. After exposure to a temperature of 3° Fah. 4. After complete desiccation. 5. After complete desiccation, and exposure to dry heat of 212° Fah. The so-called complete desiccation was effected in *vacuo.—Intellectual Observer.*

M. RIGAUT proposes a new method for reproducing lithographs. The lithograph to be transferred is first laid face uppermost on a surface of pure water, whereby all the parts not inked absorb water. It is then put between sheets of blotting paper, which absorb the excess of liquid. The lithograph is then laid face downward on the stone, to which it adheres perfectly with a little dabbing. Upon this a sheet of paper moistened with one part of nitric acid and ten of water is laid, and the whole is subjected to the action of the press. The nitric acid penetrates through the lithograph, and the stone receives its action equally in all the lights of the picture.

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ABBOTT'S METALLIC HUB.

These engravings represent a new metallic hub for the wheels of vehicles. It is so arranged that a broken spoke can be replaced by a good one without removing the tire; in addition to this peculiarity it is fitted with an oil cup so that when once greased it will run a long time without renewal.

In the engraving the plates, A, are those which receive the ends of the spokes. When put together the projections, B, form mortises between them which answer to the mortises in all wooden hubs.

These plates are screwed together by four screws passing through—one loosely and tapped into the other. The axle of the vehicle is carried in the box, C, which has feathers, D, as usual, to prevent its turning, which fit recesses in the hub plates. On the end of the box there is a thread, E, which has a cap, F, said cap being closed on the outside; a common nut, G (shown in dotted lines), being fitted to the axle itself, so as to avoid excessive end play. These are the main points of novelty.

Fig. 1

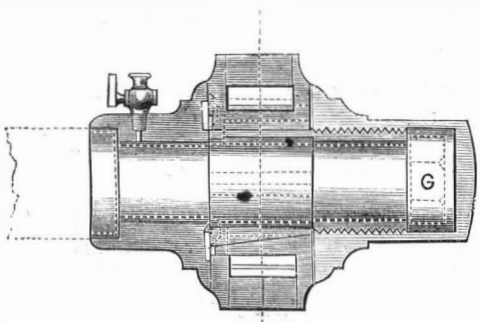
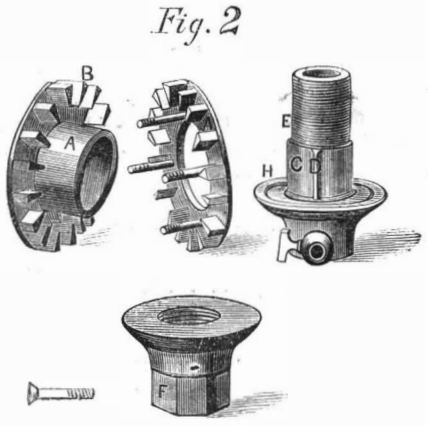


Fig. 2



In putting the whole together, the spokes are left about one eighth of an inch wider than the mortise, so that they will be firmly compressed in screwing them up, and thereby held fast. Besides the screws which hold the plates together, the cap, F, exerts a pressure upon them, the screws being only inserted to hold the spokes and plates while the axle box is put in and the cap screwed on. A channel, H, is left in the flange of the hub so that the screw heads can enter it if the cap should set the plates closer than they did at the first application.

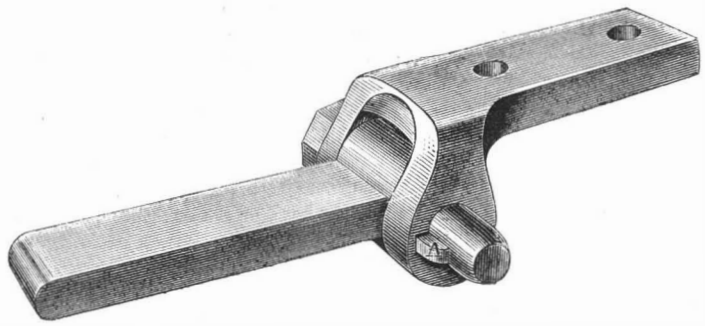
Wheels with these hubs need never be taken off except for repair, and as the joints all fit mechanically tight, dust cannot enter; the boxes will therefore wear much longer and require less greasing. The inventor states that these hubs can be made cheaper than wooden ones, and that they are stronger and more durable; also that a wheel fitted with them is more stylish and capable of variety in ornamentation. After a little practice any workman can fit two of these hubs with spokes where he can one of the common kind.

A certificate of a well-known manufacturer in Maysville, Ky., attesting these facts, has been shown us. The patent is for sale. It was obtained through the Scientific American Patent Agency on Jan. 30, 1866, by Joseph Abbott, of Washington, Ind.; for further information address M. Langhorn, Maysville, Ky.

SNUFF becomes poisonous if kept in leaden vessels, by taking up a portion of the metal.

Improved Shaft Coupling.

The ordinary screw bolt and nut used for connecting the thills of wagons to the axle, or body of a vehicle, is defective, inasmuch as the nut is frequently jarred off in a long journey. This lets the bolt out and the thills down, so that serious accidents occur.



WATERHOUSE'S SHAFT COUPLING.

Moreover, when the thills have to be taken out and a pole inserted for a double team, it occupies time and necessitates quite an array of wrenches. Various other inconveniences might be adduced, but as every one is familiar with them there is no occasion to be prolix.

The invention herewith illustrated is intended to remedy the troubles alluded to, and instead of having a nut on the bolt, a fixed spring, A, is used instead which shuts into the bolt when it is pushed through the coupling, and springs out again when it is home, very much after the fashion of a spring in an umbrella handle. Every one can see that this bolt cannot get out or rattle, and that to remove it is a work of a few seconds. It is every way superior to the common fastening.

For further information address the inventor, H. K. Waterhouse, Factory Point, Vt. Patented through the Scientific American Patent Agency on Sept. 26, 1865.

Oxidation of Vegetable Oils.

In a memoir upon this subject, read to the Academy of Sciences of Paris, M. Cloez announces the following results of his experiments and observations:—

1. That all the fat oils absorb oxygen from the air, and increase in weight by quantities which differ, for different kinds of oil placed under the same circumstances, and for the same oil under different circumstances.

2. That the hight of the temperature exercises a very marked influence on the rapidity of the oxidation.

3. That the intensity of the light also manifestly influences the phenomena.

4. That light transmitted by colored glasses checks more or less the resinification of the oils by the air. Starting from colorless glass as the term of comparison, the decrease of oxidation is in the following order: Colorless, blue, violet, red, green, yellow.

5. That in darkness the oxidation is considerably retarded; starts later and progresses more slowly than in light.

6. That the presence of certain materials, and the contact with certain substances, accelerate or retard this effect.

7. That in the resinification of oils there is both a loss of carbon and hydrogen of the oil, and an absorption of oxygen.

8. That the different oils, in oxidizing, furnish in general the same products: volatile acid compounds, liquid and solid fat acids not altered, and an insoluble solid material, which appears to be a definite proximate principle. Oils oxidized in the air no longer contain glycerin.

9. The drying and non-drying oils are not chemically distinguishable. All contain the same glyceric proximate principles, but in different proportions.

SPECIAL NOTICES.

James Sharp, of Brooklyn, N. Y., has petitioned for the extension of a patent granted to him on the 15th day of June, 1852, for an improvement in table cards.

Parties wishing to oppose the above extension must appear and show cause on the 28th day of May next, at 12 o'clock, M., when the petition will be heard.

HOOKER'S PUMP.

This pump is one that has been recently introduced in California where it took the first premium at the State Fair.

It is a good pump and will give satisfaction. It has large, clear water passages and valves which are easy of access. By breaking one joint—that of the bonnet—all the valves may be taken out and examined in case of derangement and they are so fitted that they work as well on one seat as on another.

The pump is also double-acting, and well adapted for mining purposes, for use on shipboard, in distilleries, factories, or other places where water or other fluids have to be raised quickly.

Fig. 1

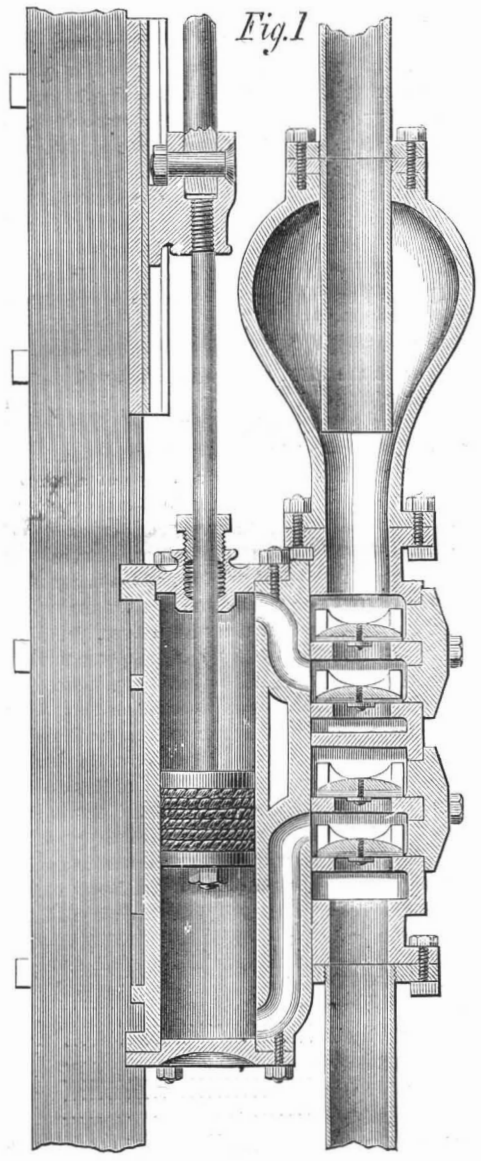
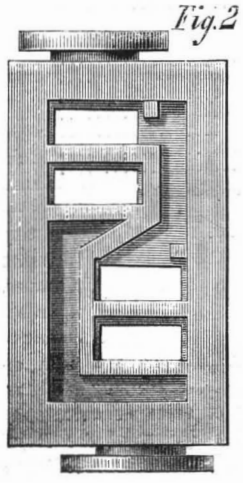


Fig. 2



It seems hardly necessary to describe this pump, the details are so clearly shown in Figs. 1 and 2. The latter is a view of the chest showing the water passage, or the openings in which the valves work. These are iron, faced with brass, and are not liable to clog or get choked in pumping dirty water.

Patented August 15, 1865, by W. D. Hooker. Address Volney Cushing, San Francisco, Cal., for further information concerning them.

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SUGGESTIONS RELATIVE TO LEGISLATION ON PATENTS."

Such is the title of a somewhat pretentious pamphlet about the size of a 9×12 window glass. The introductory chapter, addressed to the Commissioner of Patents, opens thus: "May it please your Honor—It is proper that I should state the circumstances which have induced me to present this pamphlet to your Honor." Reminding one of the prostrate style of petitioners addressing ancient sovereigns, "To His Most August and Puissant Majesty." Independent of the crude style that marks this introductory chapter, it has scarcely the poor merit of originality in a single one of its suggestions.

The writer, however, has had the vanity to suppose that a combination of poor verbiage, put into type, might at least arrest the notice of somebody.

He proposes to make the Patent Office an independent bureau—an old idea, urged in the SCIENTIFIC AMERICAN at the time the Department of the Interior was first put into operation, and since repeatedly urged in our columns. He also proposes to make provision for additional room to accommodate the growing business of the Office; to increase the number of Examiners and their salaries; to reorganize the Board of Examiners-in-Chief; to restrict the granting of interferences—which latter we have repeatedly urged; and, finally the writer calls attention to the non-reciprocal character of the Canadian patent system, and asks the authorities to take cognizance of the subject in discussing the question of Canadian reciprocity—appearing to be totally ignorant of the fact that this subject was brought formally to the notice of the proper Committee long ago.

The writer indulges in a fling at the heads of some of "his Honor's most experienced Examiners," whom he charges with erratic conduct in "granting a patent to one man one day and knocking the whole thing over by granting a patent to another man the next day." Now, we submit that there is no harm in granting a patent "to another man" every day in the week, unless the patents so granted are for the same thing—a point which the writer omits to explain, though, the inference being tolerably clear, we wish emphatically to deny the correctness of the statement. There are none of his Honor's Examiners in the Patent Office who are chargeable with such gross dereliction of duty. It is a libel upon the whole Office to put forth so bald an assertion.

This pamphlet is reinforced by the suggestions of one of the principal Examiners, a most excellent and worthy gentleman, who proposes, among other things, to provide for the appointment of an Assistant Commissioner of Patents at a salary of $3,500 per annum, to act as the legal adviser of the Commissioner, on the hypothesis that Commissioners of Patents are not always learned in the law, and are incompetent to decide legal questions.

We are opposed to this suggestion, as being wholly unnecessary. If it is desirable that the Commissioner should be "learned in the law," and we do not intend to dispute the point, then we suggest, in order to save the expense of creating this new bureau, that Commissioners "learned in the law" be appointed. For the most part this has been the case. Our Commissioners have been quite as learned in the law as any assistant that could be obtained at a salary of $3,500 per annum.

Men possessed of such eminent legal qualifications can generally find a more lucrative field outside the Patent Office; besides, ordinarily, the Chief Clerk and the Examiners-in-Chief would be able to assist the Commissioner to untie any knotty point of law that might puzzle his unlearned mind. There has been no special trouble on this point in the past, and we feel confident that there will be no trouble in the future.

In order to acquire and put in operation the additional legal and other machinery suggested in this pamphlet, it is proposed to increase the cost of applications for patents some twenty-five per cent. Indeed it is proposed to increase the general cost of patents very materially, against both of which we protest. It is not necessary thus to tax the poor inventors of the country. As we said in our last issue, applicants for patents pay enough now—besides, in view of the present large and daily increasing surplus patent fund, it would be unjust to raise the fees.

We think the Commissioner erred in suggesting an additional fee of $10 on appeal to the Examiners-in-Chief, and we think the suggestion of Examiner James, in this pamphlet, to a general increase in fees, is unwise and wholly uncalled for.

We hail with gratification all judicious propositions to reform the patent system, but we are frank to say that we do not discover in this pamphlet anything to warrant its publication. It seems rather to intermeddle with minor reforms, such as have already suggested themselves to the mind of the Commissioner, or will yet suggest themselves. If he wishes an Assistant Commissioner he will no doubt recommend such a measure to the attention of Congress; and so far as regards additional space for the business of the Office, he has already discussed the subject in his Annual Report. We should respect the opinion of Examiners touching all questions of reform, such as they may discover to be necessary in their experience, but we have no faith in mere patent-law tinkers.

The machinery of our present system, as the Commissioner justly states, works smoothly; we therefore oppose all needless tinkering with it, or throwing in things that may clog its freedom of action. We are in a position to know the views of inventors upon this subject, and we say emphatically that complaints against the patent law, as now administered, are few and far between.

FLY WHEELS FOR LONG SHAFTING.

Long lines of shafting that communicate power to machines at a distance from the prime motor, spring and buckle greatly where the work is variable. The torsional or twisting strain, tending to wrench the shaft asunder, causes back-ash in the machinery driven, so that it runs fast and slow, or unevenly; this is often a source of great loss. The remedy is to put a moderately heavy fly wheel on the extremity of the shaft, close to the hanger. This wheel takes up the strain and gives it out, or, in other words, equalizes the power, so that no change is perceptible. It is practiced in some of the Eastern cotton factories, and is found of great benefit.

ROOM IN THE UNIVERSE.

The Normans conquered England in the year 1066—just 800 years ago. If at the time of the Norman conquest a locomotive had started to cross the earth's orbit, and had been constantly rattling onward ever since in a straight line, at the rate of 20 miles an hour, day and night, making no stop for wood or water, it would yet require the long period of 200 years to complete the transit. If the span of the earth's orbit—so inconceivable vast—is reduced to a scale of 19 inches, the distance in this scale of the nearest fixed star will be 30 miles.

If the mind has the power of applying this illustration to the actual distances, it may form an idea of the extent of the interstellar spaces.

DO IT WELL

Whatever you do, do it well. A job slighted, because it is apparently unimportant, leads to habitual neglect, so that men degenerate, insensibly, into bad workmen.

"That is a good rough job," said a foreman in our hearing, recently, and he meant that it was a piece of work, not elegant in itself, but strongly made and well put together.

Training the hand and eye to do work well, leads individuals to form correct habits in other respects, and a good workman is, in most cases, a good citizen. No one need hope to rise above his present situation who suffers small things to pass by unimproved, or who neglects, metaphorically speaking, to pick up a cent because it is not a dollar.

Some of the wisest law makers, the best statesmen, the most gifted artists, the most merciful judges, the most ingenious mechanics, rose from the great mass.

A rival of a certain lawyer sought to humiliate him publicly by saying: "You blacked my father's boots once." "Yes," replied the lawyer, unabashed, "and I did it well." And because of his habit of doing even mean things well, he rose to greater.

Take heart, all who toil! all youths in humble situations, all in adverse circumstances, and those who labor unappreciated. If it be but to drive the plow, strive to do it well; if it be but to wax thread, wax it well; if only to cut bolts, make good ones; or to blow the bellows, keep the iron hot. It is attention to business that lifts the feet higher up on the ladder.

Says the good Book—"Seest thou a man diligent in his business, he shall stand before kings; he shall not stand before mean men."

ARTIFICIAL LIMBS.

In the last three sessions the Polytechnic Association has been occupied in examining several of the most popular artificial limbs in market, and a few points of general interest have been brought out.

The first thing to be noticed is the wide interest felt in the subject by the community. During the discussion the attendance has regularly increased, and at the last meeting the room was packed full. This interest is doubtless mainly due to the large number of persons who have friends that have lost limbs during the war.

Another point of interest is the wonderful ingenuity displayed by inventors, and their success in supplying with wood and metal the place of the living flesh and bones that were left on the battle fields. Most of the inventors had persons present using their limbs, and the ease and grace with which these persons walked excited universal astonishment. In several cases it was extremely difficult to detect any difference from the natural gait.

One of the most ingenious contrivances for combining strength and lightness was exhibited by Mr. Mennell, of this city. Like the others, he makes his leg hollow, but in place of boring out a piece of wood, he constructs a shell of thin splints crossing each other at right angles and glued together. He first fashions a model of wood in the form that he wants his shell; around this he winds spirally a splint of ash or oak one-twelfth of an inch thick and half an inch wide; over this are placed splints of oak from half an inch to an inch and a half in width; then a second spiral band like the first; and, finally, a second layer of longitudinal splints—the whole being glued together by a water-proof cement. A leg constructed in this way was passed around, and, at the request of the inventor, one gentleman struck it on the floor, apparently as hard as he could, without breaking it.

The Condell arm was very much admired for the ingenuity displayed in its construction. A band

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is passed around andunder the shoulder of the remaining arm of the patient, and to this three buckles are secured for attaching three straps of the artificial arm; then, by movements of the stump and shoulder, these straps are drawn—or rather the arm is pushed against them—in a way to effect three motions of the arm and hand. The fingers are provided with springs which draw them together—closing the hand; and they are connected through a combination of levers with one of the straps in such way that when the stump is pushed forward the strap draws the thumb and fingers open—completely opening the hand. When the arm is swung inward in front of the breast a second strap draws the forearm upward—bending the arm at the elbow. Finally, when the arm is swung outward, the third strap straightens the arm at the elbow.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MARCH 20, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

53,252.—Stove.—Frederick E. Adams, Baltimore, Md. Antedated March 9, 1866:

First, I claim the arrangement of a number of plates, G G, along each side of the stove, and within the fire chamber, D, so as to form a series of heat-retaining cells, with a central passage through said chamber, substantially as described.

Second, The air flue A, leading from the front door, a, beneath the grate, c, and oven, B, and back of this oven, in combination with the damper, g, and chamber, D, substantially as described.

Third, The arrangement and combination of flue, A, chamber, D, fire pot, E, space, f, and oven, B, with the dampers, g g, substantially as described.

Fourth, The combination of two grates, c c, with open-top fire pot, E, hooded air passage, a', and the hinged door, h, substantially as described.

Fifth, The combination of a tilting grate, c', which can be removed from the fire pot, E, with the wood grate c, substantially as described.

Sixth, Providing the door, h, with plates, h' h', which are so applied that when this door is inclined inward it will serve as a chute for directing the coal into the grate, substantially as described.

53,253.—Manufacture of Sheet Iron.—R. N. Allen and C. C. Hinsdale, Cleveland, Ohio:

First, We claim making the sheet-iron plate by piling and rolling in the manner substantially as set forth.

Second, We claim the piling of iron with plates of steel upon one or both sides, for the purpose described.

53,254.—Coal Sifter.—E. G. Anthony, Boston, Mass.:

I claim as my improvement the barrel coal sifters, so making and arranging the sieve with long journals, that it may be transversed diametrically in the barrel or rocked as preferred, or alternately rocked and traversed.

Also making the journals and handle of a bent rod of metal, substantially as described.

53,255.—Snap Hook.—William Armstrong, Newark, Ohio:

I claim combining with the ordinary snap hook substantially as shown by fig. 2, so arranged as to relieve the main hook of the snap of a part or all of the strain of the ring thereupon, and so that if the main hook, C, Fig. 1, of the snap be fractured or broken by a hard fall upon the ring on which it is snapped, the safety hook will retain the ring, and thus prevent accident, substantially as shown and described.

53,256.—Milk Can.—Noble P. Barnes, Carmel, N. Y.:

I claim as an improvement in milk cans, the combination of the cylindrical box, A, band, B, concave bottom, C, struck up top, D, constructed and secured in the manner herein described.

53,257.—Clothes Drier.—Joseph Barnett, Dayton, Ohio:

I claim the combination of the pole, A, arms, C C, and braces, D D, with the hubs, B B, when constructed as described and for the purpose set forth.

53,258.—Machine for Forming the Shoulders on Forks.—J. C. Batcheller, Wallingford, Vt.:

I claim producing the rounded shoulders at the junction of the lines of a fork-blank with the tang, by means of swaging dies, constructed and arranged substantially as described.

53,259.—Window Screen.—Ezra F. Beal, Oxford, Me.:

I claim the combination and arrangement of one or both the guards, G, the series of studs and angular grooves and the spring latches and catch plates, or their equivalents, with the window frame and the screens, constructed substantially as described.

53,260.—Culinary Cabinet.—Jerome Billings, Brighton, Mass.:

I claim the flour sifter, B, and the egg beater, C, combined with the cabinet, A, as specified.

53,261.—Pitman Couplings for Harvesters.—Hiram Bishop, Batavia, Iowa.:

I claim the keys, B B, and pin, C, in combination with the pitman, A, composed of two parts, a a, connected together at one end and provided at their opposite ends with conical pins, e e, to fit in corresponding shaped holes in the sickle bar, substantially as and for the purpose set forth.

53,262.—Vegetable Cutter.—A. T. Blegley, Ottumwa, Iowa.:

I claim the combination and arrangement of the cutter, C, partition, P, casing, S, and box, constructed and operating in the manner and for the purpose herein specified.

53,263.—Gate.—Alonzo T. Boon, Galesburg, Ill.:

I claim the construction of an elongated angular or inclined bar, a, as arranged when used in combination with a pivoted roller, b, substantially in the manner and for the purpose as herein set forth.

53,264.—Ditching Machine.—Jesse C. Boyd, Rushville, Ind.:

I claim the spading wheel, E, arranged to operate in the frame, N, in connection with the plow, K, having the cutters, P, and chute, M, when the same are connected with the axle of the traction wheels, A, by means of the curved bar, L, and operated by the cog rim, B, wheels, C and D, substantially in the manner and for the purposes set forth.

53,265.—Loom.—John Braum, Philadelphia, Pa.:

I claim the combination of the ratchet wheel, M, the pattern chain wheel, and the two hooked connections from the main shaft, as and for the purpose described.

53,266.—Apparatus for Desulphurizing Ores.—J. Smith Briggs, Chicago, Ill.:

I claim heating metalliferous ores and dropping them in a heated state through the air, for a suitable distance, substantially as and for the purpose herein shown and described.

Second, I claim the employment of a revolving cylinder, N, provided with internal spiral flanges, F, in combination with an adjustable head, E, arranged and operating substantially as specified and for the purpose set forth.

53,267.—Method of Protecting Wood.—Franklin M. Buel, Truxton, N. Y.:

I claim the preservation of wood from decay and the effects of moisture by coating the same with a paste, prepared substantially in the manner herein set forth.

53,268.—Flour Bolt and Bran Duster.—Abner Burbank, Rochester, N. Y.:

I claim as an improved article of manufacture, a bolting cylinder, the reticulated covering of which is formed with corrugations or ribs extending latitudinally around it, as and for the purposes herein specified.

53,269.—Steam Pump for Railroad Stations.—W. H. Butler, Chicago, Ill.:

I claim the arrangement of the floating follower, F, with the tank, A, and with reference to the inlet pipe, E, exit pipe, C, and valve, B, whereby to supply locomotive tenders with water at railroad stations, as herein set forth.

53,270.—Fire-kindling Composition.—Matthias Carstens, New York City:

I claim the fire-kindling composition prepared of the ingredients and substantially as specified.

53,271.—Stop Faucet.—William Cleveland, Orange, N. J.:

I claim securing the key to the bowl or body of a faucet by means of a screw passing through the bowl or body and its point passing into a slot in the key, and by a pin or screw inserted in the key and turning on or against the bottom of the body, so that the key by means of said screw and pin may be prevented from leaving the body of the faucet, but freely turn therein a defined distance, substantially as described.

I also claim surrounding the orifice of the faucet by a projection which will embed itself in the packing or lining of the faucet, so as to entirely prevent leakage between the bowl and said packing or lining, substantially as herein described.

53,272.—Neck Tie.—James R. Cluxton, Russellville, Ohio:

First, I claim the spring piece, d, which clasps the button of the collar and is hinged to the staple, c, constructed and operating substantially as described and represented.

Second, The staple, c, forming by means of its hooking ends the means of attachment of the pad and bow, and also forming a pintle for the hinged spring frame, substantially as described and represented.

53,273.—Manufacture of Vinegar.—David E. Cole, Manayunk, Pa.:

I claim the converting of tomato juice with the combination of sorghum and yeast rapidly into vinegar by its precise treatment.

53,274.—Bonnet Frame.—George A. Cooper and Consider Southworth, Stoughton, Mass.:

I claim a bonnet frame constructed of sized wire, substantially as described.

53,275.—Knife-cleaning Box.—Charles D. Copeland, Fall River, Mass.:

I claim as a new article of manufacture the knife-scouring box, made substantially as described.

53,276.—Ankle Supporter.—Robert Cunningham, Chicago, Ill.:

I claim an ankle supporter, especially intended to be used with skates, made in three parts or sections, B C and D, connected together substantially in the manner and so as to operate substantially as described when applied in any proper manner to the skate and leg of the person, as specified.

53,277.—Machine for Shearing Sheep.—M. C. Davis, Guilford, Ohio:

First, I claim the arrangement of the two shafts, I, jointed bars, J, and the levers, L, or their equivalents, whereby said shafts may be raised and lowered, and rendered operative and inoperative when desired, substantially as and for the purpose specified.

Second, The bars O S V X, connected by hinge joints, in combination with the swivel joints, Q T, of the bars, O S, the pulleys, N Z B', belts, A' C', rollers, and the cutters, K, composed of a vibrating cutter, Y, and three or more fixed ones, c, all arranged to operate substantially in the manner as and for the purpose set forth.

53,278.—Washing Machine.—Daniel Dishart, Canton, Ohio:

I claim the arrangement of the washboards, H H, as constructed with their slats, L L, the crank shaft, E, connecting links, J I, stuffing box, K, and box, G, the several parts being used as and for the purpose herein specified.

53,279.—Bouquet Holder.—Edward Dithridge, Pittsburgh, Pa.:

The bouquet holder, constructed substantially as described, consisting of a glass globe stand, silvered on the inner surface, with a cup-shaped depression entering the cavity of the globe, as a new article of manufacture.

53,280.—Composition for Coating Vessels for Petroleum.—William L. Dooling and David Christman, Jr., Zanesville, Ohio. Antedated March 6, 1866:

We claim a compound and the manufacture of the same, composed substantially of the ingredients before-mentioned, and its application to the interior surfaces of barrels and other casks designed to be used for holding the hydrocarbon oils.

53,281.—Roofing Compound.—George Duncan, San Francisco, Cal.:

I claim preparing burlaps with the tarry and bituminous composition, and covering the same with bituminous compound, in the manner and for the purpose set forth.

53,282.—Hand Punch.—Andrew L. Eckert, Newark, N. J.:

I claim a hand punch the main jaw of which forms three prongs, a b c, to operate in combination with the punch, d, and with the secondary jaw or spring lever, B, substantially as and for the purpose described.

53,283.—Beer Faucet.—Joseph Firmenich, Buffalo, N.Y.:

First, I claim a faucet having a tube projecting up to an indefinite point within the vertical plug, D, and fitting the inside of the plunger, the end of said tube fitting the bottom of the plunger when closed to prevent leakage, substantially for the purposes herein described.

Second, I claim the hollow plunger, D, when made so the lower end when closed will fit the lower cap, F, the tube, E, at the same time fitting the bottom of the cavity of the plunger, D, for the purposes and substantially as herein set forth.

Third, The main plug, B, the vertical plug, A, in combination with the plunger, D, and tube, E, all for the purposes and substantially as herein shown and described.

53,284.—Steam Generator.—Joseph Firmenich, Buffalo, N. Y.:

I claim a steam boiler provided with one or more flues in such a manner that the current or draft is continuous, and all or nearly all the products of combustion are returned through the boiler and fire grates, for the purposes and substantially as herein described.

Second, I claim the fan, F, or its equivalent, in combination with the flues, C C, and H, for the purposes and substantially as herein set forth.

Third, I claim the arrangement of the self feeding fuel chamber, G, between the sections of the boiler, substantially as and for the purposes described.

Fourth, I claim the arrangement of the self feeder having a double chamber around which water circulates in connection with the boiler and to prevent the burning out of the fire chamber, at the same time facilitating the generation of steam, for the purposes and substantially as herein described.

53,285.—Apparatus for Cooling Beer, Etc.—Adalbert Fischer, New York City:

I claim the combination and arrangement of the series of annular cylinders, B C, connecting pipes, D E G, and tank, A, as and for the purpose specified.

53,286.—Horse Hay Fork.—Henry Fisher and Milton Ball, Canton, Ohio:

We claim the bars, A and B, provided with the shoulders, E and F, the slotted lever, D, and the spear, C, the several parts being constructed and arranged to operate as and for the purpose herein specified.

53,287.—Filter.—Henry Flad, St. Louis, Mo.:

First, I claim in combination with filters or strainers composed of layers or strata of common stone or any other substances now commonly used, a stratum of pulverized tiff or sulphate of baryta of the proper fineness of grain, as hereinbefore set forth.

Second, A filter or strainer composed of strata of tiff or sulphate of baryta, of varying fineness of grain.

53,288.—Horse Hay Fork.—Theodore Foster, Coxsackie, N. Y.:

I claim the bent bar, D, provided with the eye or opening, a, and attached to the handle, C, by the hinge, b, in combination with the latch or fastening, F, composed of the slide, G, and the bar provided with the catch, f, and pivoted to the head, A, all being applied to the fork and arranged to operate substantially in the manner as and for the purpose herein set forth.

53,389.—Wood Splitter.—George B. Fowler, New York City:

I claim the double-edged knife, F, in combination with the lever C, when used for the purpose of a wood splitting device, in the manner and for the purpose herein specified.

53,290.—Fastening for Tea Kettle Covers.—Charles Fownes, Pittsburgh, Pa.:

First, I claim the two flat pieces, P P, or their equivalent used for the purpose specified.

Second, The combination of the disk, K, ear or lug, H', and ledge, J, cast all in one piece with the body of the kettle, with the pieces, P P.

Third, Securing the lids of the tea kettle by the hooks formed by bending over the ring, E, pieces of soft metal cast or chilled in the disk, K, in the manner and for the purpose specified.

53,291.—Car Spring.—Joseph J. Gest, Cincinnati, Ohio:

I claim in combination with arched or elliptic springs, having reversed curves at their ends, a similarly arched curved and inclined block abutment or bearing such as represented, so that as the spring settles or yields under its load, it will practically become shorter and stronger, but still retain its elastic quality and be held firmly in place and to the block or bearing, substantially as herein described and represented.

53,292.—Car Spring.—Joseph J. Gest, Cincinnati, Ohio:

I claim the combination of plate springs and alternate rockets and studs on said plates, substantially as herein described and for the purpose of attaining the greatest amount of motion with spirals worked on studs or rods in the limited space usually allowed for car and other springs, as herein explained.

53,293.—Grain Drier.—Solomon Godfrey, Peoria, Ill.:

First, I claim covering pipes for drying grain with wire gauze, substantially in the manner and for the purpose set forth.

Second, The employment of air-heating pipes for grain driers having a diameter larger in the center than at the ends, substantially as and for the purpose described.

Third, The combination and arrangement substantially as described of the fan, the heating and drying pipes, for the purpose set forth.

Fourth, The method herein described of drying grain by alternate currents of hot and cold air, substantially in the manner described.

53,294.—Stump or Stone Extractor.—Jacob H. Green, North Waterford, Maine:

I claim the combination and arrangement of the shears, the shore, the lever and the stirrup or its equivalent, or the same and the wheel frame, the whole being arranged and provided with hooks and chains, or their equivalents, so as to operate in manner, and for the purpose substantially as described.

53,295.—Machine for Sifting Sand.—Daniel A. Goodsell, of Glen Cove, N. Y.:

I claim the employment or use for the purpose of sifting sand, of a series of sieves, B, in combination with suitable mechanism for imparting to the same a shaking motion and with an elevator, E, constructed and operating in the manner substantially as set forth.

53,296.—Broom Head.—Nicholas Hall, New Market, Md.:

I claim the combination of the rocket, A, concave, K, rod, C, with bands, D and F, united by the hinge, G, and secured by the clasp, I, and hooks, H, the whole arranged and combined in the manner and for the purpose herein above set forth.

53,297.—Propeller Wheel.—Jackson Harrington and Francis Caffrey, New Haven, Conn.:

We claim a propeller wheel constructed so as to reduce the lug surface and enlarge the driving surface by means of parallel blades with an aperture between them, substantially as and for the purpose set forth.

53,298.—Process for Evaporating Alkaline Solutions.—Charles Heaton, New York City:

I claim, First, The above described process of separating the volatile from the non-volatile portions of alkaline solution by evaporating such solutions in a close boiler, under a pressure exceeding one atmosphere.

Second, Saving the steam generated from an artificial alkaline solution, when such solution is evaporated in whole or in part in a closed boiler, substantially as set forth.

53,299.—Portfolio.—Lewis Heyl, Philadelphia, Pa.:

I claim, First, The arrangement of the movable tubes, G G, at the edges of both leaves of the portfolio, as and for the purpose set forth.

Second, The spring, E, having the buttons or staples, f f, in combination with the plates, D D, as and for the purpose set forth.

Third, The cleats, L L L, as above described and adapted to portfolios, in combination with the binding strings, M M M, the said cleats having an aperture in their center to admit of the passage of the said binding strings, as shown and described and for the purpose set forth, for the proper and convenient fastening of the said strings.

53,300.—Steam Generator.—James M. Hicks, New York City:

I claim, First, The series of vertical tapering tubes arranged and operating in the manner specified, for the purpose set forth.

Second, I claim the combination with the tubes and thimble, D, of a thimble, E, arranged to operate in the manner and for the purpose set forth.

Third, I claim the surrounding division plate or separator, F, or its equivalent, in connection with the tubes and body of the boiler, arranged and operating substantially as and for the purpose set forth.

Fourth, I claim the tapering fire plate box, A, in combination with the tapering boiler body and fire space, u, when the said plate, A, and body taper in different directions, as hereinbefore described.

Fifth, I claim the combination of the circulation inducing thimble, D, with the tubes and separator, F, the whole arranged to operate as and for the purpose set forth.

53,301.—Chimney Cap.—William H. Horton, Jersey City, N. J.:

I claim the flange, B, on the upper end of the part, A, of the device in connection with the cone, C, and cap, E, all arranged substantially as shown, to ensure a proper draft, and at the same time prevent the admission of air into the device, as set forth.

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53,302.—Step Block for Carriages.—T. F. Hulbert, Chatham, N. Y.:

I claim the step block herein described, the same consisting of the platform connected with any suitable base by and through supporting frames or legs at each end, and with or without an intermediate step, substantially in the manner and so as to be operated as and for the purpose specified.

53,303.—Cultivator.—M. H. Hullinger, Granville, Ill.:

First, I claim the combination and arrangement of the curved bar, O, and the rollers, T T, operating substantially as and for the purposes specified.

Second, I claim the combination and arrangement of the beams, H and I, the posts, M, the standards, L, curved bar, O, and rollers, T T, substantially as specified and shown.

Third, I claim in combination with the above the employment of the bent levers, P, the chains, C, and stirrups, Q, as and for the purposes shown and described.

53,304.—Seed Planter.—Richard Ketcham, South Danville, N. Y.:

I claim the conducting spout, E, formed with the two pieces, o, o, to receive the axle between them, and with the vertical slots, o o', to admit of the adjustment of the spout, as described.

53,305.—Rock Drill.—W. K. King, U. S. A.

I claim, First, The combination of the guide hooks, g, rods, e, cross bar, x, and chains, c, for guiding and centering the drill, as described.

Second, The combination of the adjustable guide plate, a, slides, b and v, and spring, s, for the purpose set forth.

Third, The combination of the collar, f, with the guide plate, a, slides, b and v, and spring, s, for the purpose set forth, and

Fourth, The combination of the springs, s and t, Fig. V, with the guide plate, a, slides, b and v, and spring, s, substantially as described.

53,306.—Gun Lock.—E. Clarence Kirk, Baltimore, Md.:

I claim, First, The spring, a, pin, b, and screws, c and d, in combination with the swinging catch, E, substantially in the manner and for the purpose herein set forth.

Second, The construction and arrangement of roller, e, and slot, f, in combination with the curved forward end of spring, G, and trigger, F, substantially in the manner and for the purpose herein set forth.

53,307.—Manufacture of Steel.—Solomon W. Kirk, Coatesville, Pa.:

I claim manufacturing steel from tinned iron, substantially as herein set forth.

53,308.—Mechanism for Obtaining Intermittent Rotary Motion.—Lucuis J. Knowles, Warren, Mass.:

I claim the combination as well as the arrangement of the cranked wheel, E, the slotted lever, I, the spur gears, F G, the bevel gear, i, applied to the spur gear, G, the bevel pinion, h, applied to the lever, the bevel gear, g, and its shaft, H, the whole being for producing an intermittent rotary motion of such shaft from a continous rotary motion of the cranked wheel.

53,309.—Bed for Lithographic Presses.—Joseph Koehler, New York City:

I claim the method herein specified of adjusting the beds of lithographic presses by moving one portion of the bed upon the other, the continuous surfaces being curved, as and for the purpose specified.

In combination with the bearer and stone supporter, I claim the boxes, e and f, and adjustable stops, m, for the purposes and as specified.

53,310.—Fly Trap.—David Lake, Smith's Landing, N. J.:

I claim the traps for flies and other insects, the combination of a revolving case moving over a plane surface with a series of inclined planes like, K K, upon such surface and a swinging gate placed on and following such revolving case, substantially as shown.

53,311.—Washing Machine.—John L. Lash, Philadelphia, Pa.:

I claim the construction of the washing machine as herein described with the stationary concave, A a, convex vibrating rubber, D g, and swinging lever frame, E, all in such manner that the machine is adapted for use in a common wash tub, as set forth.

53,312.—Mechanical Movement.—Chas. B. Lewis, Clifton, Ohio:

I claim the mechanical movement constructed substantially as above described for causing rotary motion constantly in the same direction from a main shaft without regard to the direction of rotation of the latter, composed of two independent pulleys loose on the main shaft, and driven therefrom by means of ratchets and pawls or detents or by their equivalents, for each pulley, working from opposite directions, both pulleys being connected by belts, one of which is crossed, to the shaft whose motion is to be constantly in the same direction.

53,313.—Tweer.—Daniel S. Loy, Graceham, Md.:

I claim the combination with the removable plate, D, of the raised muzzle, E, and guide plate, G, substantially as and for the purpose described.

53,314.—Piston Valve.—M. P. Mack, Canandaigua, N. Y.:

I claim the tubular valve, D, with two heads, b b', in combination with the seats, c c', in the valve chamber ports, a a', leading to the cylinder, A, and with the steam and exhaust pipe, all constructed and operating substantially as and for the purpose described.

53,315.—Tweer.—David J. Martin, Covington, Ohio:

I claim in forges, the combination of the blast pipe, G, the air chamber, A, with a top perforated as shown, and the perforated rotating disk, B, substantially as above described.

53,316.—Revolving Screw Steam Ship.—David F. Masnata, New York City:

I claim an improved helicoida or revolving screw steam-ship, consisting of an interior stationary cylinder of an exterior revolving cylinder, having hollow or chambered screw threads formed on its exterior surface, and of an exterior gallery, the whole being constructed and combined substantially as herein described, and for the purposes set forth.

53,317.—Railway Track Clearer.—James A. Matthews, St. Louis, Mo.:

I claim the spring, A, bent or curved and applied to the car, substantially as shown, in combination with the scraper, G, stirrup, E, set screw, F, and bar, D, and all arranged substantially as and for the purpose set forth.

53,318.—Evaporator.—Silas B. Maulsby, Muncie, Ind.:

I claim, First, The combination of a revolving pan with a portable furnace, substantially as described and for the purpose set forth.

Second, The combination of the smoke and heat flues, E, with the pan and furnace, substantially as described and for the purpose set forth.

Third, The combination of the fluted bottom, P, with the pan and with the furnace, substantially as described and for the purpose set forth,

Fourth, The combination of the cam lever, N, with the pan and with the vertical shaft, substantially as described and for the purpose set forth

Fifth, The combination of the hinged horizontal pipe, G, with pan and smoke stack, substantially as described and for the purpose set forth.

53,319.—Quartz Crusher.—John M. May, Janesville, Wis.:

I claim a quartz rock or other crusher, constructed substantially as described, so that the distance the stamp is raised above the substance to be crushed is adjustable, substantially as described, and that said distance as adjusted will be uniform and produce a uniform force or blow upon a greater or less quantity of material to be crushed, substantially as described and set forth.

53,320.—Lamp Shade.—Josiah McFarland, Clinton, Ill.:

I claim in lamp shades, leaving a space or spaces, about the ring which receives the chimney of a lamp, in order to allow a free circulation of air, substantially as and for the purpose above described

53,321.—Wash Board.—Henry L. Meservey, Boston, Mass.:

I claim the combination of the flexible covering with an elastic stuffing or filling, substantially as described and for the purpose set forth.

53,322.—Cultivator Plow.—Thomas H. Miner and Samuel Heavenridge, Greenfield, Ind.:

We claim, First, The sliding plates, D D, with the plow standards, F, passing through them, and the plates connected to the crank, I, of a shaft, J, by rods, e e, said shaft having a cross bar, K, at its rear end provided with stirrups, L, and all arranged to operate in the manner substantially as shown to give a lateral movement to the plows.

Second, The connecting of the plow standards, F, to cranks, g, on the plates D D, by rods, f, the cranks having levers, N, attached, and all arranged substantially as shown, to admit of the raising of the plows.

53,323.—Broom Head.—David P. Myers, Salem, Ill.:

I claim the combination of the corrugated clasp, A, and overlapping sides, a, of the form herein shown, clasp bars, C, nuts and bolts, B, and handle, D, constructed and arranged in the manner and for the purpose herein specified.

53,324.—Dress Elevators.—Isaac Nathan, New Haven, Conn.:

I claim the combination of the hook, A, and pieces of fabrics, B and C, when constructed so as to be attached to the skirt, as and for the purpose specified.

53,325.—Tool for Cutting off Boiler Tube.—D. M. Nichols, New York City:

I claim, First, The shaft, A, provided with a suitable expanding or centering device in combination with the cutter, C, and suitable feeding device, all constructed and operating substantially as and for the purpose set forth.

Second, The expanding sleeve, B, in combination with the stationary and shifting cones and with the tightening screw, b, and a shaft, A, constructed and operating substantially as and for the purpose described.

53,326.—Cultivator.—D. J. Noble, New Boston, Ill.:

I claim the springs, F, applied to the pivoted plow standards, b, substantially as and for the purpose set forth.

53,327.—Weighing Scoop.—John H. O'Neil, Kingston, N. Y.:

I claim a scoop or ladle, provided with a balance, or equivalent weighing device, B, arranged so as to weigh any substance or article, in the scoop, substantially as herein specified.

53,328.—Gang Plow.—Lewis M. Patterson, Jordan's Grove, Ill.:

First, I claim the combination of the two frames, F H, one, F, being attached by a pivot bolt or screw to the pivoted bolster, C, and the other, H, attached to the front end of F, by a hinge or joint and having a lever, J, connected to it, substantially as shown for the purpose of keeping the frame, H, and consequently the plows in an elevated or a working position substantially as set forth.

Second, The bolster, C, pivoted to the axle, A, in combination with the frames, F H, and the lever, N, or its equivalent, all arranged to operate in the manner substantially as and for the purpose herein set forth.

53,329.—Seat for Vehicles.—James J. Peck, Deansville, N. Y.:

First, I claim the pendant bars, D D, attached to the front part of the base, a, of the seat, C, and provided with hooks, Z, at their lower ends in combination with the bars, B B, fitted longitudinally in the body, A, of the wagon and grooved at their under sides as shown at, c, substantially as and for the purpose set forth.

Second, I claim attaching the top of the vehicle to its seat through the medium of a frame, E, arranged as shown, or in an equivalent way, so that the frame may be held in a horizontal position above the back and sides of the seat or thrown back to the rear of the seat, for the purpose specified.

53,330.—Hand Loom.—John Pelsor, Brooklyn, Ill.:

First, I claim the arrangement of the spring, S, or its equivalent with the treadle frame and batten and arm, U, for assisting the beating stroke of the batten, substantially as specified and shown.

Second, I claim the arrangement of the lever, S, with the slide, U, arm, V, and batten, E, operating as set forth and described,

Third, I claim providing the picker staff with the pivoted arm, K, as and for the purposes set forth and shown.

Fourth, I claim supporting the ward rolle , B, in bearings having a separate horizontal adjustability, substantially in the manner and for the purposes set forth and [illegible]

53,331.—Fastening for Garments.—Rufus S. Pickett, New Haven, Conn.:

I claim a metallic button catch when constructed and fitted for use, substantially as herein described and set forth.

53,332.—Hoe.—J. C. Plumer, Boston, Mass.:

I claim in the construction of hoes the arrangement of the shank within the sockets as described, the former operated and secured substantially as set forth.

53,333.—Swivel Button.—E. H. Porter, New Britain, Conn. Antedated March 9, 1866:

I claim a swivel button made as herein described as a new article of manufacture.

53,334.—Musquito Guard.—A. D. Puffer, Somerville, Mass.:

I claim in combination with the deep frame, a b and covering, c, the narrow fringe or edging, d, the whole forming a musquito guard for the face, substantially as described.

53,335.—Churn.—John Rankin, New York City:

First, I claim the employment of a dasher having its paddles or beaters constructed and arranged in the manner specified, that is to say, with all except one set to screw or feed the cream toward one end of the box and one set at said end to screw or feed in a reverse direction, as herein before set forth.

Second, The main driving gear, m, pinion, l, pulley, K, fan pulley, I, and belt, J, the whole combined and arranged to operate in the manner specified.

Third, The employment of a blower arranged within the case of the churn and in conjunction with induction holes, 1, 2, 3, 4, substantially as and for the purposes set forth.

Fourth, The employment of the double screw dash, constructed in the manner specified in combination with the blower and air escape, e, when the said blower is located at one end and the exit, e, at the other end of the box, the whole operating in the manner and for the purposes set forth.

53,336.—Composition for Coating Iron.—Dan Read and John F. Galley, New York City. Antedated March 6, 1863:

I claim a manufacture or composition for coating the surfaces of iron or other metal and of wood and other materials, compounded of gutta-percha, asphaltum and shellac or the residuum of coal tar or the equivalent of either combined with a compound of gutta-percha, prepared for vulcanization or its equivalent in substantially the manner and for the purposes herein specified.

53,337.—Try Cocks for Steam Generators.—Joshua Regester, Baltimore, Md.:

I claim the combination of the vent stem, A, of the try cock, and the lever valve stem, B g, all constructed, arranged and operating substantially as described for the purpose set forth.

53,338.—Machine for Preparing Oval Frames for Gilding.—Leopold Reinauer, Cincinnati, Ohio:

First, I claim the imperforate eccentrically revolving bed, H, in combination with the scraper, O, connected by arm, P, and swivel joint, Q, to a fixed object outside of said bed.

Second, The elevated annular rest, N, upon a gilder's preparing bed, rotated eccentrically as set forth.

Third, The vertical shaft, B, armed with a driver, L, which traverses and rotates a bed, H, having the described or equivalent connection with a stationary eccentric circulartrack.

Fourth, The described combination of the elements, A A' B C D E F H I I' I'' I''' J and L, or their equivalents, for producing the desired adjustable elliptical movement of the bed.

Fifth, The devices, D E F a c M m, for fixing the circular track, C, to any specific eccentricity.

Second, The elevated annular rest, N, upon a gilder's preparing bed, rotated eccentrically, as set forth.

Third, The vertical shaft, B, armed with a driver, L, which traverses and rotates a bed, H, having the described or equivalent connection with a stationary eccentric circular track.

Fourth, The described combination of the elements, A A' B C D E F H I I' I'' I''' J and L, or their equivalents, for producing the desired adjustable movement of the bed.

Fifth, The devices, D E F a c, M m, for fixing the circular track, C, to any specific eccentricity.

53,339.—Fastening for Blinds and Windows.—Geo. L. Reynolds, Newburgh, N. Y:

First, I claim the combination of the sill plate, f, and catch bar, d, constructed and applied as and for the purposes specified.

Second, I claim the combination of the sill plate, f, and spring latch, g, as and for the purposes set forth.

Third, I claim the combination of the sill plate, f, spring latch, g, and catch bar, d, the parts being constructed and operating as set forth.

53,340.—Process for Refining Bullion.—John Reynolds, San Francisco, Cal.:

I claim the improved method of refining gold and silver bullion in bars, bricks or any other shape, whereby the necessity of melting and alloying with copper, and granulating before refining, is obviated, substantially as described and for the purposes set forth.

53,341.—Self-Stopping Pulley.—Thomas C. Richards, New York City:

I claim the arrangement of one or more stops, d, projecting from the circumference of the pulley, A, in combination with one or more recesses, e, in the case, B, constructed and operating substantially as and for the purpose described.

53,342.—Bottle Stopper Fastener.—Daniel F. Robinson, Boston, Mass.:

I claim the improved bottle stopper fastening made as above described.

53,343.—Portable Water Closet.—Edward Robinson, New York City:

First, The arrangement of the guide pieces, J J, and stop, K, when in connection with the tongs, I I, and the shot, T, and lever, U, operating, and for the purpose substantially as herein shown and described.

Second, The construction and arrangement of the draw-rod, M, provided with the slot, T, and passing through the cover, H, and connecting with the lever U, and stench trap lever, N, operating, and for the purpose substantially as herein shown and described.

53,344.—Gage Lock for Steam Generators.—Marcus M, Robinson, Dangola, Ill.:

I claim the combination of the gage cock, A, valve, b, arm, B, float, C, index hand, D, and adjustable scale, E, substantially as and for the purpose specified.

53,345.—Horse Hay-fork.—Seymour Rogers, Pittsburg, Pa.:

I claim making the sheath case of the hay elevator of two side pieces, of any desired shape, united at the lower end by welding or otherwise, substantially as described.

53,346.—Sheep Rack.—John Romans, Collamer, Pa.:

First, Pivoting or hanging the sides, B B, of the hopper so that the same may be converted into a roof for protecting troughs against snow and rain substantially, as specified.

Second, Hinging or pivoting the troughs, A A, so that they may be thrown or folded up substantially as set forth and for the purposes described.

53,347.—Dental Impression Cups.—George F. Schaffer' New York City:

First, I claim in dental impression cups making their bottoms in sections or separate pieces so secured to the other parts of the cups as to be removable at pleasure, substantially as and for the purpose above set forth.

Second, I also claim the bars, D D, for connecting the arch, C, and the rim, F, to each other, substantially as and for the purpose above set forth.

53,348.—Medicine Composition.—Andrew J. Runyan, Ashland, Ind.:

I claim the composition of an expectorant from the ingredients compounded and prepared substantially as set forth.

53,349.—Potato Digger.—L. F. Schanck, Holmdel, N. J.:

First, I claim the share and screen attached by a standard, R, to a bar, Q, operated from the axle, D, substantially as shown and described, to give a lateral vibratory motion to the share and screen as set forth.

Second, The adjustable roller, G, in combination with the share and screen all arranged relatively therewith, to operate as set forth.

Third, The placing of the share, S, in front of the axle, D, to admit of the vertical adjustment of the share, substantially as described.

Fourth, The spring catch, U, applied to the frame, A, in combination with the beveled rear end, l, of the draught pole, substantially as and for the purpose specified.

53,350.—Manner of Operating Shuttles in Looms.—Julius Schottenfels, New York City:

First, I claim the carrier, D, which travels in suitable guide ways in the batten of a loom where the same is used, in combination with a rising and falling shuttle frame, C, carrying two or more shuttles one above the other, and arranged to move up and down independently of the batten and carrier, substantially as and for the purpose set forth.

Second, In a loom having a rising and falling frame carrying a plurality of shuttle boxes and their shuttles, driving each of the shuttles as desired by means of a single reciprocating rack, which actuates a single reciprocating driver for all the shuttles, as described.

Third, The notched spring dogs, l, or their equivalents, in combination with the rising and falling frame, C, carrying two or more shuttles one above the other, and with a carrier, D, constructed and operating substantially as and for the purpose set forth.

Fourth, The friction stops, d d, in combination with the rising and falling frame, C, carrying two or more shuttles one above the other and with the carrier, D, and batten, A, constructed and operating substantially as and for the purpose described.

53,351.—Bolt Heading Machine.—Francis Schweizer New York City:

First, I claim the arrangement of the wedge hammer, f, in combination with two springs, h i, and treadle, f, constructed and operating substantially as and for the purpose described.

Second, The tilting platform, G, in combination with the gage, g, tongs, S, and shears, F, constructed and operating substantially as and for the purpose set forth.

Third, The compound or triple cam, v', constructed and operating in combination with the sleeve, S, and hammer, r', substantially as and for the purpose set forth.

Fourth, The tunnel, o', made in two parts which open and close by the action of suitable springs and cams in combination with the carrying tongs, f', and rocket, n', constructed and operating substantially as and for the purpose described.

Fifth, The stationary anvil, a3, and movable die, b3, both V, shaped or in any other suitable form in combination with a spring, e3, intended to force the head of the bolt or rivet out of the anvil a3, substantially as and for the purpose set forth.

Sixth, The movable tongs, d3, in combination with the anvil, a3, and hammer die, b3, constructed and operating substantially as and for the purpose described.

Seventh, The reversing fingers, h3, in combination with the tongs, d3, anvil, a3, and punch, b3, constructed and operating substantially as and for the purpose set forth.

Eighth, Adjusting the grige of the reversing fingers by a spring fulcrum, fx, or other equivalent means, substantially as described, so that the same will grip bolts or rivets of any desired size.

Ninth, The files, m3, operated by a suitable cam, n3, in combination with the clamping jaws, k3, constructed and operating substantially as and for the purpose set forth.

Tenth, The milling tool, o3, arranged on a rising and falling and laterally oscillating spindle, p3, to which an intermittent revolving motion is imparted by bevel wheels, S3, u3, or other equivalent means, substantially as and for the purpose described.

Eleventh, The compound threeway carriage, H, in combination with one or more rising and falling slides and tongs constructed and operating substantially as and for the purpose set forth.

Twelfth, The levers, k', and yoke, n', in combination with the tongs, and, a' f' g', constructed and operating substantially as and for the purpose described.

Thirteen, Giving to the standards, I K, a swivel motion by means substantially such as herein described or any equivalent means for the purpose set forth.

Fourteenth, The self-adjusting stop, i3, in combination with the swivel post, K, constructed and operating substantially as and for the purpose described.

53,352.—Churn.—John C. Scribner, Holderness, N. H.:

I claim the combination as well as the arrangement of the dasher annulus, g, and its wings, k, with the spiral or curved ledge, b, and the inclined wing or cleat, e, applied to the bottom and inner curved surface of the hub, substantially as specified.

I also claim the combination as well as the arrangement of the series of auxiliary radial ridges, f f f, with the curved ridge, b, the

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inclined cleat, e, and the annular dasher, provided with wings arranged as specified.

I also claim the combination of the sliding annulus, S, and semi-tubular bearing, t, as made and applied together and to the bail as specified.

53,353.—Sewing Machine.—Earl Harry Smith, Sherwood, N. J.:

First, I claim the employment, of an eccentric or its equivalent, to actuate the needle with the uniform motion ordinarily due to a crank or eccentric, in combination with a revolving wrist and oscillating lever operating together and actuating the shuttle, the arrangement of the shuttle with respect to the motions of said wrist and lever being substantially as specified.

Second, The arrangement and combination of the eccentric and strap, wrist and lever as specified, whereby such parts and the motions thereof act as a counterbalance to each other, for the purpose, and substantially as described.

Third. Constructing the shuttle-race with a hanger cast therewith, provided with a boss receiving and forming the bearing for the driving shaft, and supporting the feed bar and shuttle-driving lever, substantially as specified.

53,354.—Porcelain and Card Album.—J. C. Spooner, Springfield, Mass.:

First, I claim arranging card photographs, porcelain and other similar pictures in a closed case, constructed with transparent covered openings, as described, in such a manner as that they may be concealed or exhibited by being moved from the outside of the case, substantially as herein set forth.

Second, The device for holding and moving these pictures, consisting of the shoe. b, having the projection, E, attached, passing through the bottom of the case and working in a slot therein, substantially as herein described.

Third, arranging the door, D, at the rear end of the case for the purpose of closing the opening formed for the insertion of the pictures, substantially as herein set forth.

53,355.—Apparatus for Packing Animal and Vegetable Substances.—Francis Stabler, Baltimore, Md.:

I claim the combination of a receptacle in which a vacuum as above described may be produced, containing cans of animal or vegetable food, from which the atmospheric air is to be abstracted and carbonic acid or other gas incapable of supporting combustion, put in its place with the water cylinder, or any other means of producing a vacuum in the receptacle, and a gas generator, the whole operated substantially as described.

I also claim the combination of a receptacle substantially as described, for the purposes described, with a gas generator, where the gas is forced into the receptacle.

I also claim the combination of a vacuum receptacle containing the cans of food to be preserved with a frame supporting in part the lids of the cans and the rod operated from the outside to drop the lids, substantially as described.

53,356.—Manufacture of Pens.—George Stimpson, Jr., New York City:

I claim a pen of metal or other suitable material provided with sidewings, a, projecting upward, substantially as described, as a new article of manufacture.

53,357.—Railway Switch.—William J. Stowell, Baltimore, Md.:

First, I claim the construction of the switch rail, C', with an enlarged head, b, and a projecting inclined plane, c, in combination with the guide, C2, having a depressed flange support formed on it and arranged substantially as described.

Second, In combination with the pivoted rail, C2, and rail, C, and a flange support, g, I claim a device applied to the switch rail, C', which will elevate the car wheels from the main track rail and cause them to pass over on to the switch rail when the switch is in a line with the siding, substantially as described.

53,358.—Grinding Mill.—H. P. Straub. Cincinnati, Ohio:

First, I claim the combination in a grinding mill of the suspended bridge tree nuts, d g, and the jam nuts, e, on the tram bolts, S, said bridge tree being suspended at both ends, substantially as and for the purpose described.

Second, The arrangement of the tram bolts, S, and adjusting nuts, d g, in combination with the plate, b, for adjusting the stone, E, perfectly with the horizontal face of the stone, D, substantially as described.

53,359.—Distilling Apparatus.—Augustus H. Tait and Joseph W. Avis, New York City:

First, We claim the arrangement of a series of retorts, R'....Rxii, set horizontally alongside of each other over and across the fire flue with the breadth of the fire grate nearly equal to the retorts, the furnace being placed at one and the chimney at the other end of the series substantially as and for the purposes set forth.

Second, The use of an impelled current of steam or suitable gas in combination with the series of retorts, R'....Rx", substantially as specified, whereby the vapors are expelled from said retorts and at the same time the heavy vapors of the last retorts are caused to mingle intimately with the light vapors of the first retorts for the purposes described

Third, The condensers, C D, provided with condensing coils, C' D', and applied in combination with each other and with the retorts, R' R"....Rx", substantially in the manner and for the purposes set forth.

Fourth, Tapping the condensing coils, C' or D', at different levels, substantially as and for the purposes described.

Fifth, The coking retorts, Rx" Rxix, two or more, applied in combination with the retorts, R' R"....Rx", substantially as and for the purpose specified.

53,360.—Baggage Check.—G. C. Thomas, Brooklyn, N. Y.:

I claim the baggage check described, consisting of two or more disks furnished with suitable openings and inscriptions, which, together with the strap, D, indicate either the place from which the baggage comes, and to which it should go or only the place to which it should go, in the manner hereinabove set forth, or in any manner substantially the same.

53,361.—Apparatus for Dessicating Eggs, Etc.—J. B. Thompson, New York City:

I claim the general arrangement of the apparatus herein described, the same consisting in the use of a series of buckets or pans attached to a common revolving shaft and moving in and through the substance or substances to be desiccated, placed in the trough or receptacle therefor, in combination with any suitable device or devices for generating a current or currents of heated air through the chamber in which the buckets revolve, substantially as and for the purpose specified.

I also claim the combination of the revolving buckets, B B, and trough or receptacle, D, arranged together substantially in the manner described and for the purpose specified.

53,362.—Tinman's Furnace.—Stephen Timmins, Philadelphia, Pa.:

I claim the combination with a tinman's furnace of a tube, D, extending through the opening in which the soldering irons are placed into the interior of the furnace, substantially as and for the purpose described.

53,363.—Potato Digger.—Daniel J. Tittle, Albany, N. Y.:

First, I claim the revolving digging cylinders constructed substantially as specified in combination with the swinging frame, k l, and lever, m, for connecting or disconnecting the digger from its operative mechanism set forth.

Second, I claim the side plates, r', fitted to the revolving digging cylinder as and for the purposes specified.

Third, I claim the revolving digging cylinder, h, actuated in the manner set forth, in combination with the grate, q, and receptacle, r, sustained by the frame, k' and c, as set forth.

Fourth, I claim two or more shafts, d, connected rigidly to the frame, in combination with the digging cylinder, actuated as set forth, and the sustaining wheels so that the digging cylinder is sustained by the shafts to the horses when said cylinder is raised, as set forth.

53,364.—Knob Latch.—Albert W. Upton. Lowell, Mass.:

I claim the combination of the inclined heel, C, on the latch, A, the shoulder, d, on the arbor, E, the slotted sleeve, f, pin, x, and divided knobs, the whole arranged substantially as and for the purpose specified.

53,365.—Car Brake.—William Warner, Philadelphia, Pa.:

I claim, First, The use of the coil springs, E, in combination with the axles, B, by means of the cylinders, D, when arranged and operating substantially in the manner herein before described.

Second, Combining the springs, E, with the frames, F, and pulling bars, G, substantially as and for the purpose set forth.

53,366.—Door Bell.—W. H. Watrous, Hartford, Conn.:

I claim the bent lever, C, fitted loosely on the bell pin, B, provided with long and short arms, a a', connected respectively with the pull wire, E, and the loop, F, in connection with the lever, C, and the spiral spring, G, fitted on pin, c and connected to or forward with the loop, F, and hammer rod, K, all arranged to operate substantially as and for the purpose herein set forth.

53,367.—Steam Boiler Furnace.—Joseph W. Webster, St. Louis, Mo.:

I claim the construction and arrangement of smoke flue, A, and steam pipe, a, in combination with breeching, B, and fire box, C, substantially in the manner and for the purpose herein set forth.

53,368.—Drill Chuck,—Charles S. Wells and L. H. Mayott, Springfield, Mass.:

I claim the device herein described when used substantially in the manner and for the purpose herein set forth.

53,369.—Car Brake Shoe.—Henry Werntz, Pine Grove, Pa.:

I claim the metallic socket, B, formed with the dovetail flanges, b, at each end and the lips, c, at one side, in combination with a suitable catch or latch, D, and the shoe, C, notched so as to fit into the socket, all being applied to the hanger, A, substantially as and for the purpose herein set forth.

53,370.—Thrashing and Winnowing Machine.—Martin Williams, Charleston Four Corners, N. Y.:

First, I claim supporting the frame, E, upon pivoted uprights, F F, in connection with the straps, G G, at the outer end of said frame and operating the frame by means of a pitman and crank from the shaft of the fan, C, all arranged substantially as and for the purpose set forth.

Second, Attaching the swinging pendants, L, to the case, A, by means of straps, d, and keys or wedges, e, substantially as and for the purpose specified.

Third, The plate, Q, applied to the lower end of the conveyor, P, substantially as and for the purpose set forth.

53,371.—Attaching Seats to the Beds of Vehicles.—Wm. Bench (assignor to himself and Geo. Bench), Auburn, N. Y.:

I claim a device for adjustably securing the seats to the beds of wagons and other vehicles at any desired point by the stress of a lever, hinged, secured and connected substantially in the manner set forth.

53,372.—Machine for Wearing a Covering for Cords.—John Danby, (assignor to James Grover), New York City:

First, I claim the crescent shaped shoes, E E, employed in combination with the two pairs of cam grooves, g' g', arranged to corresponding distances on opposite sides of the center, c, for forming the sheds in the manner described.

Second, The radial slide, v, formed with a triangular or oblique head in combination with the pin, u, sleeve, t, handle, s, weighted lever, p, and loose pinion, m, all constructed and arranged to operate as and for the purpose specified.

53,373.—Oscillating Pump.—James E. Hallett (assignor to Edward H. Jones and Charles W. Noyes), Greenbush, N. Y.:

First, I claim providing holes or openings, a a,' arranged diagonally or nearly so with each other, and passing through the axis of oscillation of a plunger, B, as shown and described, the said holes communicating with vacuum or receiving chambers, g h, for the purpose described.

Second, I claim in combination with the above the cylinder, A, partitions, C C2, and valves, b b', the whole operating in the manner and for the purpose substantially as set forth.

Third, Fitting the packing, f f, into grooves and extending the same or permitting it to overlap the edges of the metal, when used in combination with the plunger, B, and partitions C, C2, as described.

53,374.—Lathe.—Anson Hatch (assignor to himself and John Parker Lindsay), New Haven, Conn.:

I claim the index wheel, C, in combination with a screw, as a and a graduated scale as c, when the whole is constructed and arranged and fitted to produce the result, substantially as herein described.

53,375.—Musical Instrument.—Lorenzo Marques (assignor to J. J. Ribon and J. M. Munoz), New York City:

First, I claim so arranging or hanging the teeth upon the cylinder of a music organ or box that they can be either turned up or down, substantially in the manner and for the purpose described.

Second, I also claim in combination with the above, so arranging a series of keys in connection with the teeth of the cylinder, that by depressing any one or more of the keys, the teeth corresponding thereto upon the said cylinder, will be turned up thereby, the number of which teeth so turned up being regulated by the length of rotation imparted to the cylinder while such keys are depressed, substantially as described and for the purpose specified.

53,376.—Car Spring.—W. J. F. Liddel, Erie, Pa., assignor to himself and John P. Underdonk, Buffalo, N. Y.:

I claim a torsional spring for railroad cars, constructed or bent in double or U form, with the ends, b b bent inward or toward each other and inclined upward and applied in pairs to the truck, substantially as set forth.

I also claim the semicircular blocks, I I, attached to the plate or bar, H, in combination with the springs, F F, substantially as and for the purpose specified.

I further claim the springs, F F, semicircular blocks, I I, and the blocks or bearings, E E E', all combined and arranged to operate substantially as and for the purpose set forth.

53,377.—Cotton Seed Planter.—Benjamin Owen (assignor to himself and John Owen), Dayton, Ohio:

First, I claim the arrangement of the cog gear, a b c m, with reference to the driving wheel, F, and its shaft, E, the frame, A, and the toothed wheels, a' a' b', substantially as described and for the purpose specified.

Second, The piece, n, arranged with reference to the frame, A, bolt arm, J, stay, i, substantially as and for the purpose specified.

Third, I claim the toothed wheels, a' a' b', operating and arranged substantially as described with reference to the hopper, B, and slide, D.

Fourth, The slide, D, constructed and arranged with reference to the opening in the hopper, B, and to the wheel, b', substantially as described, and for the purpose specified.

53,378.—Horse Power.—J. M. Randle (assignor to himself and J. W. Hill), Brighton, Ill.:

I claim the combination of the wheel, C, arm, C2, lever, C3, and journal, B, with the post, E, clutch ring, E', lever, E2, and ropes, D and E4, when constructed and arranged as and for the purpose set forth.

53,379.—Manufacture of Ink.—James Amos W. and Wm. H. Sanyster (assignor to themselves Hugh Sangster and Thomas J. Conroy), Buffalo, N. Y.:

We claim as our invention and desire to secure by Letters Patent, a new and useful discovery of a combination of pulverized mineral coal and rosin soap and oil or their equivalents, and the production thereby of a cheap compound to be used as ink for printing.

53,380.—Churn.—Josiah W. Sefton (assignor to himself and James McCreary), Gettysburg, Pa.:

I claim the arrangement of the pivoted dashers, H H', the dasher shafts, F F, and the double crank shaft, C E E, the whole operating substantially as described and represented.

53,381.—Stair Rod.—Amos Shipley, Newark, N. J., assignor to W. T. and J. Mersereau, New York City:

I claim combining wood and metal in the manufacture of stair rods, substantially as described for the purpose specified.

53,382.—Lathes for Turning Wagon Hubs.—Henry C. Sisco (assignor to himself Osgood and Smith), Indianapolis, Ind.:

First, I claim the movable frame, P, with the band chisels, Q Q, cutting off the chisels, R R R R, levers, S S T S S, and weighted lever, Z, thereto attached when constructed, arranged and operated substantially in the manner and for the purpose set forth.

Second, I claim the moveable frame, P, and chisels and levers attached thereto, in combination with the roughing off chisels, and countersinking chisel, when arranged and operated in the manner and for the purpose substantially as set forth.

53,383.—Hydro-carbon Burner.—James Stratton, Philadelphia, Pa., assignor to himself, G. G. Evans, Philadelphia, Pa., and D. W. Riddle, Manchester, N. H.:

I claim the supply pipe B, when arranged as herein described, to descend within the hollow flame produced by a burner E, surrounding said supply pipe.

53,384.—Coal Hod.—Samuel Thompson, George Smith, and John S. Jennings, Brooklyn, N. Y., assignors by mesne assignment, to John Pfeifer, Philadelphia, Pa.:

We claim the above complete, stamped or pressed coal hod bottom, as a new article of manufacture, for the purpose set forth.

53,385.—Apparatus for Supplying a Continuous Flow of Air.—Benoist Rouguayrol, Paris, France:

I claim the air chamber provided with what I call an air box or boxes, the parts of which are arranged and combined as hereinbefore described, and this I claim whether a single air box be used, as in figure 4, or two air boxes in combination for obtaining a regular outflow, as in figures 1 and 2.

53,386.—Knitting Machine.—Henry Thornton, Nottingham, England:

I claim the arrangement of the jack trucks, D D, the double inclined openings, v v, and the thread carrier, n, upon a single sliding frame, or carriage, the centers of the jack trucks and the centre or eyery, of the thread carrier working in the same perpendicular plane parallel to the axes, B, substantially as herein shown and decribed.

53,387.—Composition Paint.—Edward Oberlander, Henry Weiss, and Ernest Bagnicki, New York City:

We claim as a new article of manufacture the above described paint, composed of the materials and quantities, substantially as set forth, and prepared in the manner above so described.

53,388.—Priming Metallic Cartridges.—Hiram Berdan, assignor to the Berdan Fire Arms Manufacturing Company, New York City:

I claim the fixed permanent teat-like projection, S, at the bottom of the cup, N, in the head of a cartridge, in combination with the pellet or other priming inserted into and protected within the said cup, substantially as herein set forth.

REISSUES.

2,205.—Corn Sheller.—Augustus Adams, Sandwich, Ill.· Patented August 6, 1861:

First, I claim in combination with a series of conveying belts, B, or their equivalent provided with cleats or buckets, as described, the employment of a series of widening partitions, C, arranged and operating substantially as and for the purposes herein specified and shown.

Second, In combination with a series of passages formed upon the conveying belts, or their equivalent, by the described arrangement of the partitions, C, I claim the arrangement of a corresponding series of separate feeding throats or passages, D, leading down into the hopper to the sheller, whereby the ears of corn are kept separate and delivered endwise into the said sheller, substantially as described and shown.

Third, In combination with a series of separate feeding throats in the hopper of a corn shelling machine, into which the ears are delivered endwise as described, and the shelling wheels or surfaces thereof, I claim the employment of a series of picker or feeding wheels, e, or their equivalent arranged and operating substantially as and for the purposes shown and set forth.

2,206.—Utilizing Waste Vulcanized Rubber.—Charles McBurney, Roxbury, Mass.. Patented August 20, 1861:

I claim the use of the oils mentioned in combination with waste vulcanized rubber and crude gum or rubber, as set forth, for the purpose specified.

2,207.—Process for Rolling India Rubber Cloth.—Francis D. Hayward, Malden, Mass., and Ira E. Sanborn, Boston, Mass., assignees of John C. Bickford. Patented March 19, 1850. Extended 7 years:

We claim the new or improved process substantially as described of applying rubber or caoutchouc not previously dissolved by a solvent or solvents, to cloth, the same being accomplished by means of revolving rollers running at different velocities, and being so arranged that the rubber, while the cloth is in the act of passing between two of them, shall be forced and ground into the meshes or pores of the cloth by the faster or fastest of the set or series.

And we also claim the new or improved fabric or article of manufacture as produced by the said new or improved process.

2,208.—Spring for Ladies' Dresses.—Sylvester J. Sherman, Brooklyn, N. Y. Patented Feb. 25, 1862:

I claim a spring or busk for clothing having the ends permanently covered and rounded, substantially as and for the purpose herein set forth.

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Improved Cigar and Tobacco Show Case.

Buyers and sellers of cigars must have noticed how inconvenient to all parties the common cigar cases are. In one style there are a series of drawers which push out toward the buyer who selects one or more, the proprietor depending on his honesty to pay for all he takes out. Instead of this plan, however, some dealers reach over to the other end of the case depending upon their own honesty. Both are awkward and a source of loss, for cigars are frequently broken or damaged in appearance by the action, and a good many find their way out unpaid for. In short, the common arrangements for the purpose are quite defective.

We here illustrate a new cigar case, or holder, which is a vast improvement. It is capable of being made into a handsome ornament for any counter and is well adapted for its purpose. In form it is circular, covered with glass on top, and divided into several compartments. Opposite each is the price of the cigars it contains. When any particular kind is needed, the proprietor unlocks a slide (see Fig. 2) in connection with the rod, A, and moves the glass, B, which covers the aperture, to one side, so that the purchaser can make his selection; at the same time

Fig. 1.

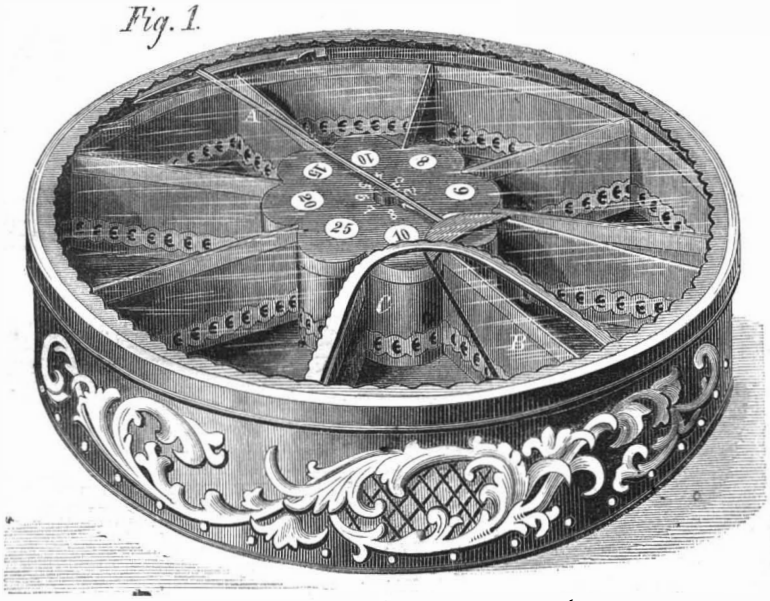
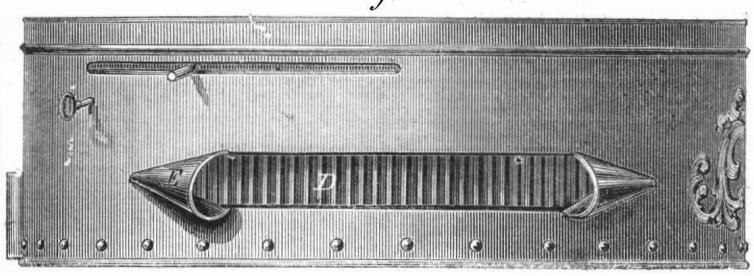


Fig. 2



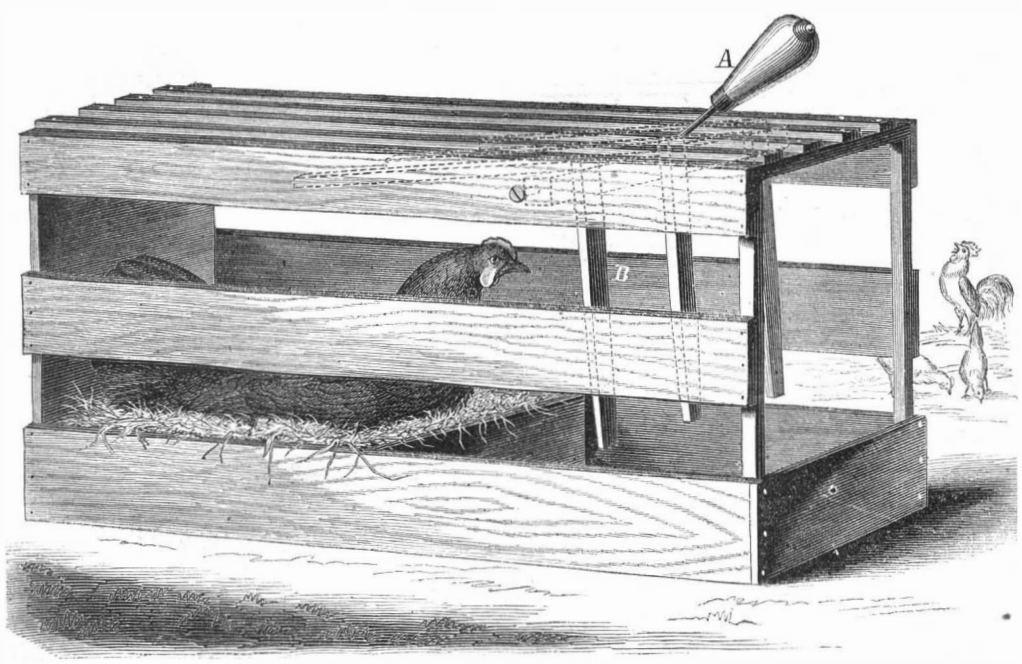
BROWN'S CIGAR AND TOBACCO SHOW CASE.

Patented through the Scientific American Patent Agency, June 13, 1865, by Chas. E. Brown, whom address for further information at No. 43 Peck Slip, New York.

Improved Hen's Nest.

This nest is intended to secure that seclusion and freedom from molestation so necessary to hens during the period of incubation. Where hens make their own nests they are apt to choose some remote spot unfrequented by others and generally inaccessible. Many eggs are lost thereby through being stolen by rats and other vermin. When hens are setting, the others try to push them off their nest, and if the setting hen is the weakest, she goes to the wall. This is a source of loss, for the hen cannot cover more eggs than are put under her at first, and many are addled or broken.

The inventor of this nest claims to have discovered a remedy for these evils and embodied it in his invention. He provides an ordinary slatted box for a nest, and to this he fastens a door, B, swinging on a pivot and furnished with a counterbalance, A. When the box is empty a hen can easily enter and occupy the nest, the door swinging back and preventing others from entering, at the same time the hen can



CAMPBELL'S PATENT HENS' NEST.

the inner case, C, is revolved through the agency of a corrugated strip, D, shown in Fig. 2. This is reached through an oblong opening in the outer case; guards, E, are fitted to each end so that the fingers will not be accidentally jammed between the two edges; the whole case is covered by glass. This is a most convenient and well-designed cigar holder and will doubtless become quite popular.

Patented through the Scientific American Patent Agency by Charles Campbell, of Yellow Head, Ill., whom address for further information.

Breech-Loading Arms.

The Government Committee on breech-loading arms, now in session at Washington, have issued the following programme to inventors and contestants:—

Each arm will be taken apart by the inventor or his agent, and its construction and operation fully explained to the Board. At the same time, a written description of the arm, setting forth its special merits, patent claims, etc., should be furnished for the records of the Board.

After a suitable number of arms shall have been examined, the Board will proceed to the Arsenal and test their working qualities; and for this purpose each gun will be fired by the person submitting it not less than 100 times.

III. After all the arms have been submitted to this preliminary examination and test, the Board will select those deemed most suitable for the military service, and subject them to further test in the hands of soldiers, by firing, for range, accuracy, penetration and rapidity; and for strength and endurance by firing increasing charges.

IV. The question of caliber will be determined by the Board after the consideration of the experiments by this and foreign Governments on this subject. The Board will however verify by actual trial the conclusions arrived at.

V. Each person will state, in writing, the lowest price at which his arm will be furnished by himself, or the rate per thousand at which he will allow the Government to make them. These proposals will be made separately on forms to be furnished on application, and will be directed, sealed, to the Recorder of the Board, and indorsed. "Proposals for furnishing breech-loading arms," and will be opened at such time as the Board may direct.

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